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LAFAYETTE L. BARBER, D. D. S., TOLEDO, OHIO

PRESIDENT OF THE NATIONAL DENTAL ASSOCIATION

THE JOURNAL

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ORIGINAL COMMUNICATIONS.

PERIODONTAL INFLAMMATIONS RESULTING FROM ACCUMULATIONS OF FOREIGN SUBSTANCES UPON THE TEETH.

By Gillette Hayden, D. D. S., Columbus, Ohio.

IN THE text accompanying these illustrations the author has adopted from Dr. G. V. Black's work on "Special Dental Pathology" the following terms. For convenience, their definitions where given by Dr. Black are also quoted.

The "Investing tissues" consist of the gums, "gingivae, peridental membrane, cementum and alveolar process." (p. 7.)

Gums. "The gums clothe the alveolar processes and the hard palate" and "consist of soft tissue noted for its compact inelastic firmness, which spreads from the crests of the alveolar processes and covers the alveolar ridges well down and away from the teeth in all directions." (p. 7.)

Gingivae. "That division of the tissues of the mouth which we call the gingivae comprises the soft tissue which rests upon the crests of the alveolar process, including the crests of the septi which pass between the teeth, invests the gingival portions of the roots of the teeth and rises about the gingival portions of their crowns. The parts of the gingivae are the **body**, the **free gingivae** and **septal gingivae.**" (p. 11 and 13.)

"The **free gingivae** and the **septal gingivae** consist of that tissue which is grown upon the body, which encircles the gingival portion of the enamel of the crown of each tooth." (p. 13.)

"The **septal gingivae** are processes of soft tissue growing up from each septum of the body of the gingivae, and under normal conditions fill each interproximal space to its contact point." (p. 17.)

"Crests of the gingivae." "Toward the occlusal, the free gingivae thin down to a knife-edge margin, which I shall generally call the **crest** of the gingivae." (p. 13.)

"Crest of the alveolar process." That

Fig. I.

Fig. II.

Fig. III.

part which forms the border of the alveolar process around the gingival portion of the roots of the teeth is the crest of the alveolar process.

"Septal tissues" are the investing tissues of the teeth located between the teeth.

"Agglutinin of calculus." "Salivary calculus is composed of calcium phosphate with the addition of smaller amounts of calcium carbonate, held together in mass by an organic compound which, according to general opinion, is formed after the material has been deposited upon the teeth, natural or artificial. The fresh deposit is very soft and greasy to the feel of the finger, insoluable in water, alcohol and most fluids that one would likely try. This mass I have called **agglutinin** or **agglutinin** of calculus." (p. 73.)

These specimens are presented in an effort to demonstrate in pictorial form the wide variation existing between the normal state of the investing tissues of the teeth, and those progressive, pathological conditions resulting from the accumulation on the tooth surfaces of foreign substances which, collectively, may be termed the debris of the mouth.

This debris consists of soft and hard accumulations and is made up of agglutinin of calculus, mucous, food stuffs and dead epithelium, all of which are fermentable in part or entirely, and of microorganisms, and salivary and serumal calculus.

With the exception of those cases of injury to the septal tissues caused by the impaction of food between teeth lacking contact and to which attention is called, this collection of specimens does not attempt to present faulty dental operations, irregularities of the teeth or injuries with their resultant destructive changes in the investing tissues of the teeth. Altho the results upon the investing tissues in these cases is very similar if not identical to the pernicious effect upon them brought about by the accumulation of foreign substances upon the teeth yet the primary exciting cause is in a measure quite different, and a consideration of these primary exciting causes is not included in this discussion.

Each of the first eight specimens represents a composite type and not an individual case, as is the ninth. On one-half of the jaw of each specimen is shown the bony structure investing and supporting the teeth, and Fig. IV to Fig. IX inclusive show on the same side the accumulations of salivary and serumal calculus and the heavy stains frequently present. It has not been possible to represent the soft accumulations with any degree of accuracy.

On the other half of the jaw the overlying gingival and gum tissues are depicted. From Fig. II to Fig. VIII inclusive, the inflammatory and destructive changes in the gums and gingivae shown on this half of each illustration are brought about by the accumulations of debris found represented in part upon the opposite half of each specimen.

Figure I represents the normal investing tissues of the teeth. On the right half of the specimen the alveolar process is seen in its normal relationship to the teeth. The alveolar crest is always found to be slightly below the gingival line, usually two millimeters, according to Black. In the normal mouth a definite distance between the gingival line and the alveolar crest is maintained, the curve of the alveolar crest apparently being established in conformity with the curve of the gingival line.

On the left half of the specimen the gums and gingivae are represented. The free gingivae which thin down to a fine edge at their crest overlie and are in close contact with the enamel surfaces of the gingival portion of the crowns of the teeth. The septal gingivae fill the interproximal spaces up to the contact points of the teeth. The gums and gingivae in health are always firm and dense in structure and rather

Fig. IV.

Fig. V.

Fig. VI.

insensitive. In color they vary with the individual, being lighter in blonds and darker in brunettes but the color is always clear and has a translucent quality which gives these tissues a vital and glistening appearance. In comparing the color of the lips with the gums and gingivae the latter will be found a few tones lighter but in the same key of color as the former. The color of these soft tissues grows a little lighter as the free gingivae merge into the gum tissue overlying the alveolar ridge and becomes more intense and darker as the gums in turn merge into the soft mucous membrane.

Figure II represents an uncared for mouth. Extensive deposits of fermenting and putrifying debris and microorganisms are found on all sheltered tooth surfaces. Food is being masticated very indifferently. On the right half of the specimen no change has taken place in the alveolar process except where the first molar has been lost and where the mesial and buccal alveolar crest about the second molar has been destroyed. This latter condition was probably brought about thru caries of the first molar, loss of contact between it and the second molar with the resultant impaction of food in the interproximal space.

The left half of the specimen shows the effect upon the gums and gingivae of accumulations on the teeth of fermenting and putrifying debris and microorganisms. No calcic deposits are found in this type of case but mucoid and gelatinous plaques and a soft, cheesy, cream colored mass permeated with bacteria covers all the sheltered tooth surfaces. Etched enamel surfaces and caries characterize the teeth in a mouth where these conditions of uncleanliness prevail. Gingival caries is seen on the first bicuspid and molar.

The free gingivae are swollen and everted, their crests have become thickened and the septal gingivae have become so enlarged that the tissue has been forced out buccally, labially and lingually from the interproximal spaces.

The color indicates the amount and extent of the inflammation which, altho of long standing, has not yet reached the point where the parts involved have become so lowered in vitality that the loss of an appreciable amount of tissue has resulted.

Figure III represents a mouth where daily, tho unintelligent, care is being given. Fermenting and putrifying debris and microorganisms are present. On the right half of the specimen there is a slight absorption of the alveolar crest. (The alveolar process over the third molar was broken in the preparation of the specimen.)

The left half of the specimen shows what is usually known as recession of the gums. In reality this recession of the gums means the loss of the labial free gingivae, portions of the gum tissue and peridental membrane and the crest of the alveolar process. In this case it is due to the accumulations on sheltered areas of the teeth of mucoid plaques and fermenting and putrifying debris permeated with microorganisms, to rough, unpolished tooth surfaces and to an unintelligent and harmful use of the tooth brush in addition.

It will be noted that there are swollen and everted gingivae about each tooth and that there is a distinct line of color demarcation over the alveolar ridge. The clear, bright and intense red color of the gingival and gum tissue calls attention to the vitality of the parts involved and to the effectiveness of the circulating mechanism in meeting the demands made upon it.

Figure IV represents a mouth which shows the effect of accumulations of moderate quantities of fermenting and putrifying debris, of microorganisms and of abundant quantities of agglutinin and salivary calculus.

No daily care is being given the mouth but the mastication of food is fairly well performed. The development of the

Fig. VII.

heavy alveolar ridge in this case is worthy of attention.

The right half of the specimen shows the accumulation on the teeth of salivary calculus which forms only on the exposed surfaces. This type of calculus does not form subgingivally. Practically no loss of the alveolar crest has taken place.

The left half of the specimen shows the effect upon the soft tissues of these accumulations on the teeth. The color is much deeper and the tissue more congested than that in Figure III, but the inflammation does not extend so far into the gum tissue overlying the alveolar process. This is probably due not only to the fact that the vitality of the tissues is high but also to the fact that a less quantity of fermenting food stuffs and microorganisms seem to lie in direct contact with the free gingivae, thus limiting to some extent the causes of a more active inflammation. The free gingivae, against which these masses of salivary calculus lie, are almost denuded of the outer layers of epithelial cells and the crests of the gingivae are flattened in appearance when the calculus is removed. This partially denuded surface of the epithelium offers ingress into the tissues for microorganisms. It will be noted that there is a tendency toward the formation of fine bluish lines running from the gingivae toward the root ends of the teeth and ending in small irregular spots between the apices of the roots of the central incisor and cuspid, between the cuspid and second bicuspid and between the first and third molars. These lines seem to be veins in a state of congestion thru which infection gains entrance into the deeper structures and the larger areas showing the bluish tinge seem to be the centers toward which these lines are directed.

Frequently the accumulations of salivary calculus plus the ever present fermenting debris and microorganisms, form is such bulk as to destroy the investing tissues of the teeth and to cause the loss of the teeth themselves without the formation of pus pockets. The destructive changes in the investing tissues take place just beneath the deposit and on a line drawn at approximately right angles to the root of the tooth.

The areas showing the greatest destruction of the investing tissues in these cases are to the labial and lingual of the lower incisors and to the buccal of the upper molars, tho the investing tissues of all the teeth are often involved.

Figure V represents a mouth which is receiving very indifferent daily care but the use of the teeth in mastication is good. The heavy alveolar ridge displayed on the right half of the specimen is worthy of notice. To the accumulations of fermenting and putrifying debris, microorganisms and salivary calculus are added heavy stains and thin rings of serumal calculus which are found under the free gingivae and are just beginning to encroach upon the root surfaces of the teeth. There is a slight loss of the peridental membrane fibres and also a slight loss of bone cells of the alveolar crest.

On the left half of the specimen the color of the soft tissues is marked by an increase in the depth of the color in the free gingivae especially. The congestion of these tissues is particularly marked from the first bicuspid anteriorly. This is due not only to the accumulations of debris upon the teeth but also to the lack of contact which is most noticeable between the incisors. The impaction of food at these points increases the inflammation and the hypertrophy of the gingivae very markedly as the color indicates.

As in Figure IV the crest of the gingivae is almost denuded of the outer layer of the epithelium, thus depriving the tissue of its normal protection form the ingress of pathogenic bacteria. The specimen portrays imperfectly the bluish, irregular area found in the tissues overlying the apices of the centrals, bicuspids and molar teeth.

Fig. VIII.

The usual line marking the boundary of the area of greatest inflammation is plainly shown. This line of demarcation indicates the point at which the protective forces of the tissues have formed a defensive barrier against the encroachments of microorganisms and the tissue destroying products of the debris upon the teeth.

Figure VI is the lower arch of Figure V and shows the change brought about by a partial removal of the debris accumulated upon the tooth surfaces.

The right half of the specimen shows that the visible deposits on the crown surfaces of the teeth have been largely removed, leaving only the subgingival deposits of serumal calculus. With the mechanical removal of the bulk of the salivary calculus and the fermenting and putrefying debris with its admixture of pathogenic microorganisms, there is invariably a prompt reaction in the tissues as indicated in the left half of the illustration. The congestion of the tissues is reduced to the minimum. The bluish area around the neck of each tooth would be almost entirely and immediately eliminated by the removal of the serumal calculus, for the majority of this color is due to the brownish black sermual calculus shining thru the translucent free gingivae.

The septal gingivae between those teeth where the contact is lacking can not be depended upon to return to a healthy condition as long as there is an open space between the teeth.

By referring to Figure I it is possible to picture this case after proper treatment has been carried out. The removal of all debris from the teeth and a thoro polishing of all tooth surfaces together with the obliteration of the spaces between those teeth not in contact, either by means of orthodontic or operative procedure, would place this mouth in almost a normal condition.

Figure VII represents an uncared for mouth where the abundant accumulations of debris have so lowered the vitality of the tissues that rapid and active loss of the investing tissues of the teeth is in progress. The general vitality of the individual is also low. An abundant flow of pus from the pockets about the teeth characterizes this stage of periodontoclasia.

The left half of the specimen shows extensive loss of the alveolar process about the roots of the teeth, especially in the anterior portion of the mouth and to the lingual of the molars.

Accumulations of fermenting and putrefying debris permeated with microorganic life, salivary and serumal calculus and stains are present in great quantities.

The right half of the specimen illustrates that deeply congested, tumefied condition of the soft tissues so characteristic of the suppurating stage of periodontoclasia. The vitality of these soft tissues is so impaired that a state of congestion exists thruout the soft tissues. The margin of the gum tissue is denuded of its protecting outer layer of epithelium and the deep color is indicative of the congested condition of the soft tissues on this surface. The blue lines extending toward the root ends of the teeth and the bluish area in which they terminate are fairly well shown in this illustration.

Pus wells up from deep pockets about the roots of the teeth when the slightest pressure is brought to bear upon the gum tissues in this type of case.

There has been much loss of gingival and gum tissue and peridental membrane as well as loss of alveolar process.

Figure VIII represents a mouth that is uncared for but one showing high vitality of the tissues and a general high resistance of the system to disease. The accumulations of debris are found in great masses upon the crown and root surfaces of the teeth. The four incisors are missing in the specimen. Two are lacking because they were held in place during life chiefly by the remnants of the peridental membrane. The

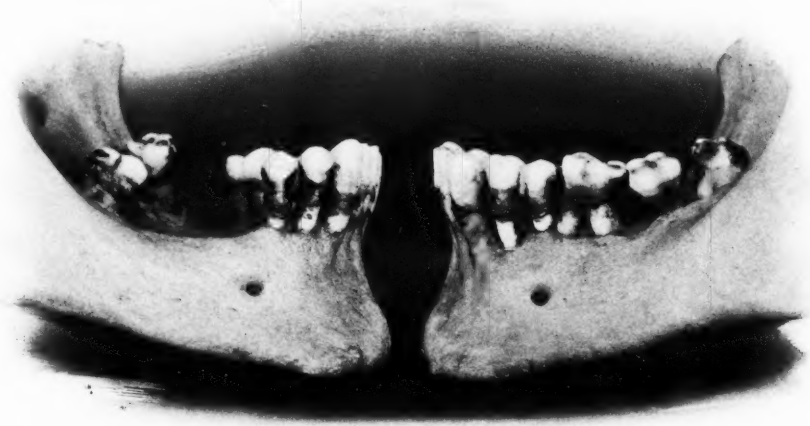


Fig. IX.

other two were denuded of peridental membrane over one half of their root length.

On the left half of the specimen the accumulations of fermenting and putrefying bacteria infested debris, salivary and serumal calculus and heavy stains are depicted. There is much loss of the alveolar process; that between the molars being almost completely destroyed. The sepital process is lacking in varying amounts between all the other teeth also.

On the right half of the specimen the color of the gums about the visible portions of the roots of the teeth shows a highly inflamed area extending in varying lengths toward the apices of the roots. This area with its irregular contour outlines the depth of the pockets about the roots of the teeth and indicates the point to which the destruction of tissue has progressed. Pus is to be found in all these pockets.

The active circulation and high resistance and vitality of the tissues in this case are limiting to a great extent the ingress of microorganisms into the deeper structures. In this respect there is a very marked difference between this type of case and that represented in Figure VII. This illustration should show, however, the bluish areas in the tissues overlying the apices of the roots of the teeth, where a venous stasis seems to exist due probably to an invasion of these tissues by microorganisms and their products. This condition is present in every case where such destructive tissue changes are taking place.

Figure IX. In the preparation of the specimen all debris which was removable from the teeth by the process of boiling in lysol, in chloride of lime and in borax is lacking. Most of the salivary and much of the sermual calculus was dislodged and lost in the rough scraping this specimen received in a college anatomical laboratory.

It is an undecorated specimen showing the loss of the alveolar process and indicating plainly the destruction in both the peridental membrane and in the gums and gingivae which must have existed as a result of the accumulation on the tooth surfaces of fermenting and putrefying debris, microorganisms, salivary and serumal calculus and stains.

(The Standard Dictionary gives preference to putrefying.)

EXTRAORAL CONDUCTIVE ANESTHESIA FOR ORAL SURGICAL OPERATIONS.

BY KURT H. THOMA, D.M.D.

Lecturer on Oral Histology and Pathology and Member of the Research Department of Harvard University Dental School. Instructor in Dental Anatomy, Harvard Medical School. Oral Surgeon to the Robert B. Brigham Hospital. Visiting Dental Surgeon to the Long Island Hospital. Consulting Oral Surgeon to the Boston Dispensary.

(Read before the Joint Meeting of the Interstate Association of Anesthetists and the National Dental Association, Louisville, Ky., July, 1916.)

THE possibility to fully control the pain in operations about the mouth and jaws by conductive anesthesia may be called the greatest progress in oral surgery that has been achieved in the last decade. Local anesthesia does not only free the region of the operation from the presence of the anesthetist and his appliances but also eliminates the dangers attending general anesthesia, namely the swallowing and aspiration of blood and pus. The absence of vomiting after the operation is another advantage eliminating the disintegration of the wound by the vomitus. The partial co-operation of the patient during the operation, the haemostatic action of the injections which makes the operation less bloody, and the absence of certain instruments used to administer the anesthetic or to open the mouth make possible aseptic methods and better technic.

Notwithstanding these great advantages we must, however, select our cases. Children as a rule are poor subjects for large surgical operations under local anesthesia; also sometimes very intelligent older children form exceptions, but even then it depends a great deal on the extent of the operation. Amongst the adults there are, of course, those who will only consent to an operation when performed under general anesthesia, while many patients for whom general anesthesia is counterindicated and dangerous can well be taken care of with the local methods. The excitable, nervous, and timid patient who dreads knowing what is going on, or is afraid of the instrumentation can almost always be taken care of easily by proper praeanesthetic medication.

The larger number of dental and oral surgical operations can be performed under anesthesia produced by the intraoral methods. The Extraoral methods are indicated: 1. For all extensive cases where a large area is to be anesthetized and when the common nerve trunk supplying this area is not accessible from the mouth. This is especially the case for operation about the upper jaw.

2. For cases where deep penetration of the tissue is necessary to reach the nerve trunk we should prefer the extraoral methods to the intraoral ones, as they permit perfectly aseptic technic and therefore eliminate the danger of infection.

SENSORY INERVATION OF THE ORAL REGIONS.

Figure 1.

The success of local anesthesia depends a great deal upon the exact knowledge of the sensory inervation and nerve anestomosis of the parts to be operated on. A clear picture of the nerves and anatomical relations of the surrounding parts should be constantly before the anesthetist's mind.

1. TEETH, ALVEOLAR PROCESS AND GUMS OF UPPER JAW.

Incisor region	Teeth and labial part	Ant. Sup. Alveolar	Infraorbital	Second Division of V.
	palatal part	Naso palatine	Spheno-palat. G	
Bicuspid and molar region	Teeth and buccal part	Middle and post. sup. alveolar	Infraorbital	
	Palatal part	Ant. palatine	Spheno-palat. G	

2. TEETH, ALVEOLAR PROCESS AND GUMS OF LOWER JAW.

Ant. region to 1st Bicuspid	Teeth	Inf. alveolar	Inf. alveolar	Third Division of V.
	Labial part	Mental	.....	
	Lingual part	Lingual	.....	
Post. region from 2d bicuspid to 3d molar	Teeth	Inf. Alveolar	.....	
	Buccal part	Buccinator	.....	
	Lingual part	Lingual	.....	

3. INERVATION OF UPPER JAW, MAXILLARY SINUS, AND LOWER JAW.

Upper Jaw	.....	Entire	.....	Second division of V.
Max. Sinus	External part	Sup. Alveolar Branches	Infraorbital	Second division of V.
	Internal part	Nasal branches	Spheno-palat. G	
Lower Jaw	.....	Entire sensory branches	.....	Third division of V.

4. INERVATION OF PALATE, CHEEKS, TONGUE, FLOOR OF MOUTH, LIPS.

Hard Palate	Ant. part	Naso. palatine		Second division of V.
	Post. part	Ant. palatine		
Soft palate	Soft palate	Mid. & post. palat.	Spheno-palat. G.	
	Uvula	Mid. & post. palat.		
Cheeks	Mucous membrane	Buccinator	.....	Third division of V.
Tongue	Ant. part	Lingual	.....	Third division of V.
	Post. part	Lingual branch	.....	Glosso-pharyngeal
Floor of Mouth	.....	Lingual	.....	Third Division of V.
Lips	Upper lip	Labialis superior	Infraorbital	Second division
	Lower lip	Mental	Inf. Alveolar	Third Division of V.

5. INERVATION OF THE SKIN OF FACE AND NECK.

Skin of outer cantus	Lachrimal		
Upper Lid, Forehead and Crown	Supra-orbital	Frontal	First Div. of V.
Skin of Inner Cantus	Supra-trochlear		
	Infratroclear	Naso-callary	
Tip of nose	Ext. nasal		
Ant. Part of Temple	Zygomatico-temp.	Zygomatic	
Malar Region	Zygomatico-facial		Second Div. of V.
Lower Eyelid and ant. part of cheek.	Palpepral	Infraorbital	
Ala of nose	Nasal		
Upper Lip	Labial		
Angle of Mouth	Buccinator		Third Div. of V.
Ant. part of Auricle, Temple and Cheek.	Auricolo-temporal		
Lower Jaw and Chin	Mental	Inf. alveolar	
Angle of Jaw	Ant. branch of great Auricular		
Post. Auricular region	Post. branch of great Auricular		Cervical Plexus
Inf. border of Jaw	Sup. cutaneous Coli		
Ant. part of neck	Inf. cutaneous Coli		

PRAEANESTHETIC MEDICATION.

For ordinary dental or small oral surgical operations no special preparation is required. Extremely nervous patients and children may receive Bromural-Knoll, (alphabrom isovaleryl-urea), which is an excellent sedative.

If extraoral injections are used, praeanesthetic medication is always indicated. For small operations Bromural is sometimes sufficient, but for deep injections followed by a severe operation I give Veronal gr. X before retiring and Morphia gr. ⅓ thirty minutes before the operation. This stupifies the patient sufficiently so as not to mind the insertion of the needle. It also takes away the terror of the operating room and instrumentation, which are otherwise more or less feared by the patient.

INSTRUMENTS AND DRUGS.

Figure 2.

For the extraoral methods I use a Luer or Record syringe, containing 5 cc. and steel needles of various lengths.

For the anesthetic I use a 2% Novocain solution with 0.000,02 gram. Suprarenin synthetic to one cc. This is prepared in the Novocain cup immediately before use, by dissolving the T* or a combination of E* and F* Tablets in Ringer solution. For local injections which are sometimes used in addition to the conductive method in order to control anestomosis or bleeding, I use a solution containing more suprarenin, namely 0.000,05 to one cc., prepared by dissolving one E. tablet in one cc.

*Farbwerke Hoechst, New York.

TECHNIC OF ADMINISTRATION.

Extraoral injections must be made under strict aseptic conditions. He who is not familiar with surgical aseptic methods should not undertake to use extraoral anesthesia.

Figure 1.

LATERAL VIEW OF FACE SHOWING NERVE SUPPLY OF SKIN.

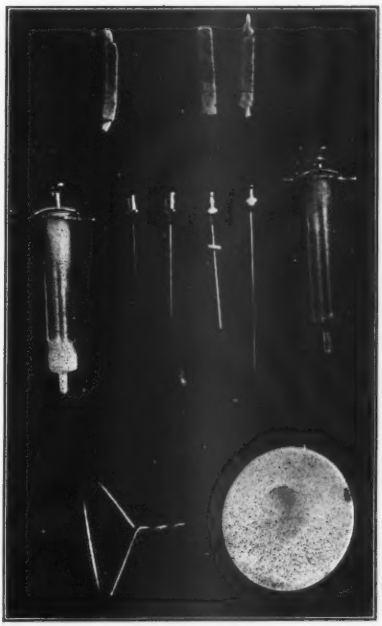
1. Lachrymal N. 2. Supraorbital N. 3. Supratrochlear N. 4. Infratrochlear N. 5. Ext. nasal N. 6. Zygomatic-temp. N. 7. Zygomatic facial N. 8, 9, 10. Palpepral, nasal and labial branch of infraorbital N. 11. Buccinator N. 12. Auricolo-temporal N. 13. Mental N. 14, 15. Post. and ant. great auriculor N. 16, 17. Sup. and inf. cutaneous Coli.

A—Supplied by 1st division of V. B—Supplied by 2nd division of V. C—Supplies by 3d division of V. D—Supplied by cervical nerves.

The skin of the patient's jaw is prepared for the injection by application of tincture of iodine over a large area. The washing and shaving of the skin should be undertaken a reasonable time before the operation.

If praeanesthetic medication is used, no special application is needed to reduce the pain from the needle. A small amount of the solution is injected under the skin. After the needle is fully inserted suction should be applied before injecting. If blood is drawn into the syringe it is a sign that the point of the needle entered a vessel. It should then be withdrawn a short distance.

Figure 2.



INSTRUMENTS.

Cup to dissolve novocain. Luer syringes containing 5 cc. Assortment of needles. E. F. and T. tablets.

A. MAXILLARY ANESTHESIA.

1. Infraorbital Method.

Figures 3 and 4.

Landmarks. The infraorbital foramen can be palpitated easily under the inferior border of the orbit.

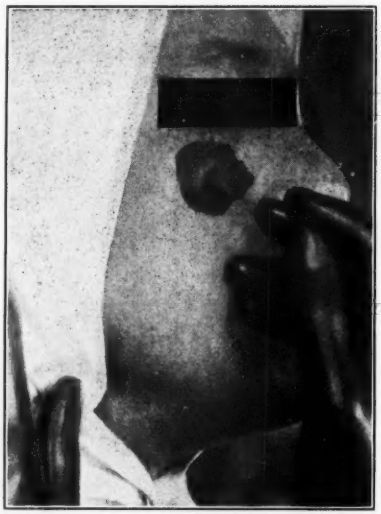
Injection. A very fine needle is inserted directly into the infraorbital foramen from the surface of the skin a distance

of about 1½ cm. It is important to make sure that the needle is not inserted into a vessel which would be indicated by discharges of blood. 1½ cc. is injected with low and even pressure.

Waiting Period. The anesthesia usually occurs in a very short time.

Area Anesthetized. Same as in the intraoral method; namely, the upper incisor teeth, labial part of gum and the area supplied by the palpepral, nasal and labial branch of the infraorbital nerve.

Figure 3.



Shows the needle about to be inserted into the infraorbital foramen. Ordinarily I use a short and very fine needle for this purpose.

Figure 4.

Radiograph showing the needle inserted into the infraorbital foramen.

Duration of Anesthesia. In this method we do not depend upon infiltration of the anesthetic solution thru the infraorbital foramen, as in the intraoral method, and therefore get a quicker and more lasting result.

2. ZYGOMATIC AND MAXILLARY METHOD.

The intraoral methods of conductive anesthesia of the upper jaw have never been as satisfactory as those of the lower jaw because there is no place where the blocking of the whole maxillary division can be undertaken successfully from the inside of the mouth and because the point of inserting the needle is not remote enough from the field of operation to come outside the disease zone in extensive lesions. Nevertheless we can well take care of the teeth and their immedate surroundings with the intraoral conductive and the infiltration methods. But for large surgical operations in the oral cavity, and especially in war surgery the maxillary injection is a great advantage.

Figure 5.

Landmarks. Palpitate the superior border of the zygomatic arch and find the place where it forms a right angle with the superior margin of the orbit. This is called the "zygomatic angle."

From this point draw a vertical line downwards and the point for insertion of the needle is about ½ cm. below the place where this meets the inferior border of the zygomatic arch.

Zygomatic Injection. With the teeth in occlusion insert the needle with syringe mounted. A few drops are injected under the skin. Advance in a vertical direction to the cheek for 2 to 3 cm. Here we strike the maxillary tuberosity. If only the posterior molars are to be anesthetized, the injection can be made here and we have the extraoral method of the zygomatic injection.

Figure 5.

This slide shows the outline of the bony landmarks for the zygomatic and maxillary injection. Find the zygomatic angle and draw a line from this point vertically downward. ½ cm. below the place where this meets the inferior border of the zygomatic process is the point for the insertion of the needle.

Figures 6 and 7.

Maxillary Injection. If the whole upper jaw is to be anesthetized, we continue in the same direction. Sometimes it is necessary to direct the needle a little further backward to pass by the tu-

Figure 6.

Shows a skull with the needle in place to anesthetize the second division of the 5th nerve below the foramen rotundum.

Figure 7.

Shows the needle about to be inserted for the extraoral maxillary injection.

berosity which is felt for orientation, and enter the spheno-maxillary fissure. After further advance of 2 cm. we again find bony resistance when the point of the needle strikes the inferior part of the anterior surface of the larger wing of the sphenoid bone, just below the foramen rotundum. The depth at this

Figure 8.

Landmarks to find projection of the mandibular foramen upon skin. Draw a line from the tragus of the ear to the point where the anterior border of the masseter meets the inferior border of the mandible. Divide in halves. The point of division marks the location of the foramen.

place is about 5 cm. 1 to 2 cc. is injected. The injection is purposely made below the foramen to keep away from the nerves supplying the eye.

Symptoms of Anesthesia. After about five minutes the patient feels numbness in the nose, sometimes also in the upper lip, but the symptoms are much less marked than in the lower jaw.

Waiting Period. Complete anesthesia usually occurs in from ten to fifteen minutes.

Area Anesthetized. Practically all the parts supplied by the maxillary division are anesthetized, the maxillary bone, the teeth, the gum, half of the palate and upper lip, the anterior part of the cheek, the skin of the nose, the antrum and part of the nasal cavity.

Anastomosing and Communicating Nerves. Branches from the other side have to be considered and the facial branches of other divisions of the fifth.

Duration of the Anesthesia. The anesthesia lasts from 2 to 3 hours.

Undesirable Symptoms. Anemia in the region of infraorbital artery sometimes causes circumscribed whiteness on the part of the cheek which is supplied by it.

Diffusion of the solution into the orbit is liable to occur, causing occular disturbances of short duration. The occulomotor or abducens nerve may be infiltrated causing double sight, weakness in the upper eyelid, dilation of the pupil and if some of the accompanying vessels are affected, anemia of the eyelids will be observed. Sometimes anesthesia of the soft palate gives difficulty in swallowing. All these complications, which occasionally accompany the anesthesia last from fifteen minutes to two hours and are of no serious consequence, merely inconveniencing the patient for a short time. The patient should be told that these conditions occur at times and that they are of a harmless nature, so that he will not be frightened and lose his confidence. As this method is only used for operations of a serious and extensive nature we can consider the occasional occurrences of the complications a small factor compared with the advantage of positive asepsis and the disadvantages of general anesthesia for such operations in the mouth.

B. MANDIBULAR ANESTHESIA.

1. Extraoral Pterygo-mandibular Method.

This injection is made into the same place as the intraoral one; namely, the pterygo-mandibular space. It is indicated whenever the intraoral method cannot be used, as is often the case in fractures of the mandible and trismus of the muscles of mastication.

Figure 9.

Shows the needle about to be inserted for the extraoral pterygo-mandibular injection.

Landmarks.

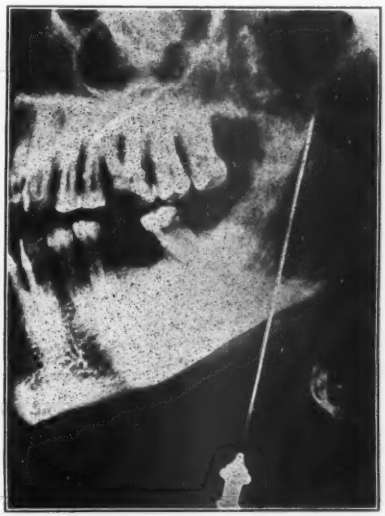
Figure 8.

A line is drawn from the tragus of the ear to a point marked by the anterior margin of the masseter muscle and the lower border of the mandible. The point where the mandible is divided into two halves marks the projection of the mandibular foramen upon the skin. The place to insert the needle is at the inner side of the lower border of the mandible, 2 cm. anterior to the angle of the ramus.

Figure 9.

Position of left hand for the injection on the right side: Place index finger behind and parallel with the posterior border of the ramus, the thumb in the same direction, its tip touching the lower border of the ramus.

Figure 10.



Shows a radiograph with the needle inserted for the extraoral pterygo-mandibular injection.

Position of the right hand for injection on the left side: The left arm is passed around the patient's head, the thumb is placed behind the posterior border of the ramus and the index finger bent around the angle of the ramus. The head is bent towards the opposite side. The dismounted needle is now inserted at the point described.

Figure 10.

Advance in a parallel direction to the posterior border of the ramus, marked

on the left side by the thumb and on the right side by the index finger. After the needle has been inserted about 4 cm. we are in the pterygo-mandibular space, and as the direction of the needle is parallel with the nerve, it does not matter if the needle is inserted a little too far. Inject 2 cc.

Figure 11.

Shows landmarks for mandibular injection.

Symptoms of Anesthesia. Numbness of the lip is felt about five minutes after the injection.

Waiting Period. Anesthesia takes effect in fifteen minutes.

Area Anesthetized. The lower teeth and jaw on the side injected, the lower lip and anterior part of gum.

Anastomosing and Communicating Nerves.—The inferior alveolar nerve on the other side anastomosing in the incisor region and the lip. The lingual nerve supplying the inner part of the gum. If anesthesia of this nerve is required, it has to be taken care of separately. This can be done in two ways, either by withdrawing the needle about 1 cm. and reinserting it in the vertical direction which brings it further forward, or by inserting the needle 5 cm. which brings it higher up near the place where the inferior alveolar and lingual nerve divide.

Duration of Anesthesia. Same as for the intraoral method; namely, about one hour if 2 cc. is injected.

Failures. The advance of the needle may find bony resistance in the depth of 3 cm. This comes from false direction of the needle point, striking a well-marked internal oblique line. The needle may strike bone at once, which may indicate a well-marked protuberance for the attachment of the pterygoid muscle. These mistakes are remedied by changing the direction of the needle.

2. MANDIBULAR INJECTION.

Anesthesia of the mandible can be accomplished very successfully by the intra and extraoral method of injecting into the pterygo-mandibular space. For the operations on the ramus, especially the superior part, and if the pterygo-mandibular injection is contraindicated in account of pathological conditions, we may resort to the mandibular method.

Figure 11.

Landmarks. A line is drawn from the zygomatic angle to the tragus of the ear. Divide into halves just below this point and the inferior border of the zygomatic arch is the place to insert the needle.

Figures 12 and 13.

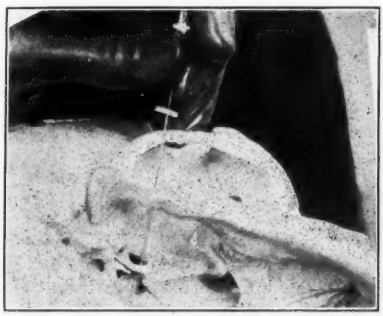
Injection. Insert the needle and advance in a slightly upward direction. The needle passes anterior to the neck of the condyle and below the zygomatic arch. A few drops may be injected at once. After advancing to a depth of 3 to 4 cm. the point of the needle should strike the smooth infratemporal surface. Now feel your way along for one more cm. until

you strike the mandibular nerve, when the patient notices suddenly a radiating pain in the region supplied by it. Inject from 2 to 5 cc.

Symptoms of Anesthesia. The same as in the pterygo-mandibular injection.

Waiting Period. Ten to twenty minutes, depending on how close we get to

Figure 12.



Shows a skull with the needle inserted to anesthetize the third division of the 5th nerve.

the nerve and on the amount of solution used.

Area Anesthetized. Teeth and bone of the mandible, lower lip, chin, corner of the mouth, lower part of the cheek and temporal region.

Anastomosing and Communicating Branches. The anastomoses from the other side and in some operations, branches of the cervical plexus.

Ladies and Gentlemen: Extraoral methods of anesthesia for the mouth are not original with me. Such methods have long before been described by Braun and his scholars, but have never become very popular.

I hope, however, that these simplified

Figure 13.

Shows the needle about to be inserted for the extraoral mandibular injection.

methods presented today and the fact pointed out that such methods are less dangerous than similar ones, undertaken from within the oral cavity, on account of perfect asepsis, will be found not only a great help to the oral surgeon, but a benefit to the public in general.

THE ESTABLISHMENT OF OUR OWN MONTHLY JOURNAL.

By Otto U. King, D. D. S., Huntington, Indiana.

(Read before the National Dental Association at Its Twentieth Annual Session, Louisville Ky., July 25-28, 1916.)

"ROME died because Romans glorified in their past reputations, and stood stock-still until dry rot undermined their efficiency." To have been a Roman may have been the same as to have been a king, but in these days even kings or a great profession must hustle and show some ability to meet their problems in an intelligent manner.

Some one has said "Upon the brink of mighty things we stand."

Never before in the history of the dental profession have we stood upon the brink of so many mighty things as we do today.

All the past years have been like a snowball rolling up to greatness. Today is a summing up of all these years. It is the storehouse into which the founder of our profession, the inventors, the scientific research worker, every thinker, every humble dentist that has ever lived has poured in his treasurer and thus contributed the results attained by our profession today.

Today is the biggest day in the world's history for the dental profession, because it is made up of all the days that have gone before it, and in it are packed all the successes, all achievements and all the progress of the past.

The dental profession is now on the border of many significant studies relative to our future progress. The near future must reveal a marked advance in our classified scientific knowledge. There is the great problem of pyorrhea alveolaris, the problem of dental caries and the problem of root canal work. A problem in itself which means the most careful scientific investigation. Every dentist must have a clear vision of the significance of focal infection in the mouth as a factor in general disease. There are other great fundamental truths underlying many problems in dentistry that must be known before the dental profession will ever be able to do full justice to itself or to humanity. We must not continue to extract so many innocent teeth, or grow indifferent and leave diseased teeth in the mouth as a menace to the health and happiness of our patients.

DENTAL JOURNAL REFLECTS PROGRESS.

The great mirror in the dental profession that reflects progress is the dental journal. One of the greatest factors in the advance of dentistry and in giving to it a professional foundation has been the dental journal. Prior to it, dentistry was a trade. The profession of dentistry had its beginning in the foundation of the dental journal as it reported to the earnest practitioner of that day a medium for the exchange of thought and experience.

"During the same year that the dental journal was established—1839—the first

dental college was opened, and shortly after, the first dental society was organized. Thus t' 9 three elements of professional life, professional activity and professional progress were contemporaneous and co-operative in giving to dentistry and to its practitioners a new standing in the eyes of the world."

HISTORY OF DENTAL JOURNAL.

When dentistry was a trade, those men engaged in it were few and had no dental societies. Each man was a free lancer or a law unto himself. The dentist of that day was completely absorbed in extracting teeth and making plates, inserting amalgam fillings, making his own alloy from instructions received from his preceptor.

There were other men who manufactured dental supplies and in order to educate the dentistry it was necessary to employ traveling salesmen, which was a very expensive proposition because of the few dentists and the long distances between them.

Another method of salesmanship and much more satisfactory, was the establishing of a dental magazine or house-organ.

The latter was the more effective because it not only could carry the advertisements of these newer ideas in equipment and filling materials, but also descriptions of methods used by various men. Thus the dental journal, published by the manufacturers of dental supplies and with one aim in view, namely, to create a demand for various dental goods and a medium thru which the manufacturer could instruct the dentist in their use.

One of the leading dental journals editorially coroborated this statement by saying, "If independent dental journalism is such an expensive luxury, it may be asked why it is that trade houses have established and continued to publish periodicals devoted to dental literature."

"The answer is very simple, for they are thus supplied with a means of reaching their market thru the advertising pages. This is a frank statement, but there is no reason why an honest fact should not be openly admitted."

DUE CREDIT TO DENTAL JOURNALS.

Many of these dental journals or house organs have been so independently edited by noble dentists and published by such unselfish manufacturers of dental supplies as to have been of inestimable value to our profession.

To the dental journal it may be said that the glorious history of our profession began with the inception of the dental journal. Without this medium of exchange of ideas and the mouth piece thru which scientific truths could be published to the profession, we would not today enjoy such an exalted position among professions.

A JOURNAL FREE FROM "TRADE" CONDITIONS.

The fact that practically all the national journals now published are either owned or controlled by persons or firms manufacturing or selling dental supplies, is in itself a sufficient reason for the publication of a journal by the National Dental Association. No journal controlled by those interested in the manufacture or sale of dental goods can be wholly independent; it cannot properly censor for the best interest of the dental profession its advertising pages; it cannot publish freely or frankly many things of vital interest to the dental profession for fear of giving offense to some of those who purchase the goods its owner has for sale; it cannot boldly advocate certain reforms which if accomplished might injure the "business" methods of some of its customers; it is, in short, more or less handicapped by "trade" conditions. To supplant this condition many dental societies have undertaken the publication of their own dental journal, of which there are quite

a large number at the present being published.

In an editorial in the Dental Review, on "The Widening Sphere of Dental Journalism," the editor says: "One of the most hopeful signs of the times in dentistry is the growing tendency toward the establishment of dental journals. This relates particularly to journals published by state dental societies, as organs chiefly of the organizations which issue them. It has become so common for a state society to publish a journal or bulletin, that the society which does not do this is almost an exception. We look upon this as most promising for the future welfare of the profession. The more men read the better informed they will be, and the sooner the habit of reading will become fixed. State society members may be counted on to read a periodical published by their own society when they will read no other, and after they have read their own for a time they begin to develop a desire for a wider course of reading, and eventually they take to the larger and longer established journals."

In this day of myriad publications springing up from every side, it is a sad commentary upon our profession that our great national organization, so full of capable men and backed by one of the greatest bodies of scientific workers the world has ever known, should hesitate at this task of immediately establishing and publishing our own journal on a monthly basis.

RE-ORGANIZATION OF THE NATIONAL.

The reorganization of the National Dental Association at the 1913 meeting marked the beginning of a new era in professional advancement in the history of dentistry. Neither the segregation of dentistry from the many professions nor the founding of the first dental school in Baltimore nor again the appearance of the first dental periodical marked an epoch of greater importance than the successful culmination of the wisest effort in behalf of an organization truly represented in name and character.

The National Dental Association under the consummation of the re-organization plan has had a phenomenal growth. From a membership of less than 800 in 1913, we increased to over 12,000 in 1914, over 15,000 in 1915, and we will undoubtedly reach our slogan of 20,000 members in 1916. Many state societies are just now organizing component societies and appointing membership committees and in various ways promulgating a membership campaign. There are now on file in the general secretary's office sufficient delinquent members and other ethical dentists in various states to increase our membership to 25,000 in 1917. Such a prospective outlook based on these facts should be a strong factor in the consummation of our plans relative to the publication of our own monthly journal.

OUR OWN HOUSE ORGAN, THE JOURNAL.

One of the recognized expert advertising editors recently editorially said:

"The growth of the house-organ idea is one of the most remarkable phenomena of American advertising. Today thousands of advertisers are publishing magazines of one type or another, with the direct object of pushing their business."

Since the advertiser in his house-organ is likewise the publisher, he has unique advantages. He has no competition. He is unlimited as to space. He is foot-free as regards policies and ideas, and in the same publication he may develop a dozen different selling and advertising ideas.

But the essential, underlying idea of the house-organ is that it shall be educational.

If the great business world deems it so essential to their business interests as

to go to the enormous expense of publishing and mailing to their customers gratuitously their own house-organ, can a great profession that has assumed the responsibility of looking after the health of humanity overlook this greatest asset, or opportunity of educating its membership in advancing every phase of its work?

That our National Association should have a literary mouth-piece of its own, clothed with the prestige and scientific attainments of its component units, no one could reasonably gainsay. "It is in the course of professional evolution the second logical step and the **sine qua non** in the struggle toward the goal of practical idealism."

ESTABLISHING AMERICAN MEDICAL JOURNAL.

Dentistry is now passing thru the stage medicine passed thru years ago—that of publishing their own official medical journals. Of the two hundred and seventeen medical journals published in the United States and Canada, more than nine-tenths of them are published by medical societies, thus making them professional first and commercial second. What dentistry needs today is a national dental journal that will do for dentistry what the American Medical Journal did for medicine. We have a national journal and a good one, but it must develop into a monthly journal, for unfortunately our quarterly journal has come at rather irregular intervals. This within itself detracts very materially from what would best meet the situation as the leading dental journal of our country.

A few months ago, while in Chicago, it was my privilege to visit the home of the great American Medical Association. I went to the headquarters of this organization to learn from the editors and business managers the intricate detail of their system of bookkeeping, to get a more definite idea of their plans of operation, and information relating to the success of their publication, The American Medical Journal.

While I stood in front of this modern office building with its gigantic presses, and its modern machinery and office equipment, I thought, is it any wonder that the medical profession is making such great strides on this American soil? See this organization that reaches from the greatest surgeon to the physician in the very smallest villages. Into every hamlet and city in this great country of ours, goes out every few days from this home of the medical profession all the latest scientific research knowledge. I say, is it any wonder that in the last few years the medical profession has made such monstrous strides? It has advanced from the crude methods of a generation ago to the infinitely delicate, painless, and shockless operations on the head, lungs, and the formerly inaccessible parts of the body.

OTHER PROFESSIONS AND TRADE ASSOCIATIONS HAVE MOUTH-PIECE.

Many large associations have realized the necessity for the establishing of their own official mouth-piece. In fact, today practically every profession has its own publications and likewise many of the trades. In the advertising business there are a goodly number of independent publications, chief of which is Printer's Ink, known all over the English speaking world. Thru its efforts and influence a law has been passed in nearly every state against fake and fraudulent advertising.

Another is the official organ of the Associated Advertising Clubs of the World, with a big circulation. You recall the big convention in Philadelphia which closed last Friday, attended by thousands of publishers and advertisers from all over this country; a greater convention than either of the presidential conventions.

"Truth in advertising" is the motto

and the official organ reaching thousands of advertisers and publishers, is having much to do with purifying the advertising pages of the publications reaching our people. This official organ "Associated Advertising," published monthly, is the mouth-piece of this great association and is doing a wonderful work in favor of clean papers and clean advertising columns.

The National Retail Hardware Association, with a membership of 15,000 supports a monthly bulletin of 200 or more pages and is doing splendid work for its membership. Its staff, together with special committees, watches closely every piece of national and state legislation that would in any manner affect detrimentally their business.

Another striking illustration is the wonderful magazine published by the National Geographical Society. This organization a few years ago consisted of only a handful of loyal scientific investigators in this field of work. Their secretary realized that the voluminous amount of research reports being compiled by this society was failing to educate the public for lack of publication. So they conceived the plan of publishing a small bulletin and today this little publication has grown into a beautiful and instructive monthly journal. Possibly the best illustrated magazine published. Its membership has increased by leaps and bounds until hundreds of thousands are now enrolled as members and subscribers. It is an independent publication and can carry on its work unhampered and untrammeled.

A journal for our association is just as essential as a journal for publishers, and printers, and there are several of them absolutely independent and working for the best interests of their members. The organization of printers whose members work at daily wage, have their own official magazine and supported by about 60,000 subscribers.

Then there is "American Journal of Public Health," official monthly publication of the American Public Health Association. A magazine that is of inestimable value in bettering the public health of our nation.

OUR PROFESSIONAL RESPONSIBILITIES.

The responsibility of protecting and furthering the interests of the profession, which responsibility has been so cheerfully assumed and faithfully carried out by the present dental journals, will be chiefly delegated to The Journal of the National Dental Association, leaving the other journals free to work along their individual professional lines, to specialize, so to speak, as they might not successfully do without a large and really national dental organization having its own journal.

We have already, possibly in a small degree, consummated one of the greatest propositions in connection with the advancement of modern dentistry, viz: the perfecting of a great National Dental organization. However, the second great proposition and one just as important as the first, is the establishment upon a strong financial basis a monthly independent journal. When we have consummated these two great undertakings, we have a strong working body that will become more secure and will develop and grow with the years. Many of our other undertakings will fail unless we have a monthly mouth-piece thru which each department may make a report and reach the dental profession each month. Every member of our association should get a vision of our future possibilities and see how much the carrying out of our future work and plans depends upon a successful monthly journal.

EDUCATION IN ORAL HYGIENE.

To educate the public in oral hygiene thru dental societies, it is necessary that the National Dental Association have its own mouth-piece to educate its own membership, for if the oral hygiene com-

mittee of the National Dental Association should formulate certain plans for the education of the public, it is very essential that this committee have at their command a journal thru which they may publish their plans and keep in touch with every oral hygiene committee of each state in the Union. Thus our membership will know where to look for such information and reports. While if this educational proposition is left to every journal to act as our mouth-piece our membership or our local societies become confused. All definite plans, to command attention, should be announced officially thru our own journal.

RESEARCH PUBLICATION.

One of the most important factors in any scientific research work is the dissemination of the knowledge gained by these investigations or reports as soon after they are obtained as possible. It is absolutely necessary for the Research Institute of the National Dental Association to have a mouth-piece thru which it may be able to keep our entire membership in touch with every phase of its work, if we expect this scientific research work to be of practical service to the man who operates at the dental chair or for the teacher in our colleges.

The Research Department cannot possibly be satisfactory to either the National Dental Association or to those doing the researches without at least a monthly journal for publication. We have had very severe criticisms from both the dental profession and from the research workers, because of the long delay in the publication of the reports.

We have been advised by some research directors that they prefer the National Journal to any other dental journal, except for its too infrequent publication.

Professional spirit is a process of growth and can only be accomplished by continued and consistent education, at such frequent intervals that problems appear to have continuance, as well as sequence.

With an adequate journal and a worthy research department properly cooperating, the members of the dental profession will make more advancement, as individual dentists and also professionally, in the appreciation of the medical profession and the laity than by any other means, if not than by all other agencies combined.

LEGISLATIVE COMMITTEE WORK.

The Legislative Committee of our Association has been able to secure very satisfactory legislation during this Congress, as shown by their report to the House of delegates. But they were continually in need of a mouth-piece thru which they could lay their plans before our membership each month, in order to secure a more enthusiastic co-operation and response from our membership. We were able in practically every state in the Union to secure a list of ten live wires in each Congressional District as an active committee of dentists to look after their particular Congressman or Senator. How much easier and how much more satisfactory could this work have been done thru a legislative department in our own monthly journal?

The time has come in the history of our Dental Society work when we must have a monthly journal if we expect to hold together and to cement into a great homeogeneous working organization the great dental profession of the United States.

Not only the oral hygiene committee the Research Institute and the Legislative Committee have needed a journal or will need it in the future to promulgate their plans, but every other department of the Association will fail to do their dead level best, if it is not able to place its plans or the results of its work before the individual member of our Association at the earliest and most practical time to carry on its work.

COPY FOR THE JOURNAL.

The journal will have no trouble in securing sufficient copy to publish the present journal on a monthly basis. As we now have all the papers and discussions read before the National Association fifty-three (53) papers for this meeting, the reports supplied thru the Research department; and the various departments which must be established in order to make our journal not only a scientific publication, but also a journal of practical value to the dental profession. We have at the present time two other scientific bodies that have asked for permission to publish their reports thru the columns of our journal, for they are anxious to have their reports published in the journal that is the most representative, in fact, there is so much copy in sight at the present time for our monthly journal, that it will not be far distant until the journal can be published as a semi-monthly.

In summarizing: Every great organization must have a medium or intercourse such as is afforded by an official publication. Other national organizations have proven the practicability and necessity for their own mouth-piece.

A national organization which has jumped from 700 to 20,000 members in three years has so clearly shown its aggressive and progressive spirit that it should publish the best mouth-piece of its kind in the world—absolutely under the control of the National Dental Association.

In order to give the journal the respect and force that it should have, and at the same time promptly publish all the papers presented before the National, as well as such other material as it naturally should publish, it is necessary to promptly establish it on a monthly basis.

All thru our re-organization work we have held out the inducement that a National Journal, that was the equal in its field, as other national journals, would eventually be furnished our membership.

Our journal must be independent, in that it will not be owned or controlled by persons manufacturing or selling dental goods. It should be a journal whose policies can be absolutely untrammeled.

That there should be a censorship over all papers and advertisements appearing in our journal. The journal is the only means we have of keeping in close touch with our component societies as represented in the state organizations.

That the journal will typify progressiveness, accuracy, and scholarship, adhering always to the highest ideals of clean, constructive journalism; it should be an exponent of high ethics in the dental profession.

That the Research Institute which promises to do much that will advance the profession in many ways and render valuable service to humanity will have a chance or medium thru which it may report to the profession each month.

INFLUENCE OF THE JOURNAL.

The establishment of a monthly journal makes me think of the sun pulling the raindrops up from the sea. They come back to us in the moisture that makes the earth yield its harvest So our journal will draw the enthusiastic cooperation and confidence to it in proportion as it is animated by the warmth of sincere desire to serve and it will be returned to the journal and to the profession in progressiveness, accuracy, and scholarship.

I have said such a publication should be published monthly. In these days of two or more editions of dailies, electricity, motor cars, areoplanes, zeppelins, submarines, and the like, anything of less frequent appearance than once a month could not well maintain an interest, without which failure would follow.

THE EUTOPIAN.

The eutopian in our monthly journal will not be reached in a single bound.

Everything that has been done well, has been done calmly. Many things that have been done poorly owe their failure to the haste, or lack of calmness with which they were performed. It took the American Medical Association years to reach its present state in independent journalism. We too will be compelled to fight a few cases of "Wine of Cardui," or go thru the valley of criticism and misunderstanding before we reach our goal of the ideal practical, independent dental journal.

The dentistry of today is a growing profession; like the great tree, Ygdrasil, in the Norse legend, whose roots are deep in the past, whose branches were in the sky of the great future.

When Alexander was asked how he had conquered the world he replied: "By never delaying." So the great dental profession should:

"Seize the passing moment, big with fate,
From opportunity's extended hand,
When the great clock of destiny strikes, NOW."

DENTAL EDUCATION.

By Henry L. Banzhaf, B. S., D. D. S., Milwaukee, Wisconsin.
Dean, Dental Department, Marquette University.

(Read before the National Dental Association at Its Twentieth Annual Session, Louisville Ky., July 25-28, 1916.)

IT IS known to all of us that the subject of dental education and of Dental School courses has come up for discussion again and again in the meetings of this Association. In the treatment of most problems one is likely to be over-influenced by his own personal opinion and view point, altho the call is imperative for a broad and impartial treatment. As Secretary of the Dental Educational Council of America for the past five years, I have been fortunate enough to have an experience which I believe has greatly widened my horizon, and I hope to discuss the subject from a broad standpoint.

The condition of our Dental Schools is not so bad as many dental educators would have us believe. Here and there, it is true, a school may be found whose management and equipment are far from being ideal; but on the whole they are doing excellent work and we are proud of them. There is, however, room for improvement, and it is a good omen that this is recognized, and that there is an increased willingness to accept constructive criticism. Some Dental Schools are still much over-crowded; some lack efficient management; and some are financially unable to afford the best courses. Great improvement may, however, be looked for in the near future in all of our Dental Schools, and it must be looked for, because such improvement is absolutely necessary.

Several organizations have exerted, and are now exerting a most wholesome influence upon the Dental Schools of America. The National Association of Dental Examiners, organized in 1883, has accomplished much by its annual tabulation and publication of records of Dental School graduates certified by the state boards of the country. This organization has done excellent work also in unifying state requirements and state examinations, and has continuously exerted a restraining and inspiring influence upon schools inclined to be lax. The American Institute of Dental Teachers, organized in 1893, has had large influence in raising the standard of dental teaching. The National Association of Dental Faculties, organized in 1884, and the Dental Faculties Association of American Universities organized in 1909 has likewise had a beneficial and disciplinary influence upon all schools. The National Dental Association since its organization in 1859 has had a similarly wholesome influence. This is true especially in recent years thru the medium of its research Commission, in its Oral Hygiene Campaign and in its support of the Dental Educational Council. It is logical and inevitable that the responsibility of dental education should rest with the profession itself, and certainly there is no professional organization which is more representative than the National Dental Association.

It is generally conceded that the or-

ganization which is today taking the most active and influential steps towards the improvement of dental education is the Dental Educational Council of America. This is a commission composed of five delegates each from the National Dental Association, National Association of Dental Examiners and the National Association of Dental Faculties. Its purpose is to study Dental Schools, dental curricula and dental laws. It was organized in 1910. During the past three years it has been engaged in visiting the Dental Schools of the country and making a survey of them with a view of rating and proper classification. A report upon the result of the survey will shortly be issued. This shows that the task of raising the character and work of Dental Schools is well under way.

The problem of improving general dental curricula is likewise in a fair way to be solved. It is a matter of common opinion that the current three year course is inadequate to teach modern-dentistry. The objections to the three year curriculum fall under four heads:

(1). It is overcrowded.

(2). It has been found impossible to give the student a satisfactory knowledge of the fundamental sciences which tend to develop a scientific attitude of mind.

(3). It is not possible to give the student satisfactory training in the principles of scientific dentistry.

(4). It lacks some of the modern influences possessed by courses leading to degrees in other professions.

It is quite generally conceded that many of the objections to the three year course may be overcome by adding a fourth year. All of the influential dental organizations already mentioned have gone on record in favor of this change, and as a result Dental Colleges generally are preparing to give a four year course beginning with the session of 1917-18.

What I have been advocating, and what most of us are advocating, is a forward step, as the "next thing." No one doubts that we shall sooner or later have to take the step here proposed. Many of us, I believe most of us, are of the opinion that it should be taken now.

And we must be ready to go forward in the future. Altho it requires no great provision to see something of what our educational policy must be ten years from now, still a step at a time is the wisest.

Recent history in dental education is most interesting. You well know that not so long ago dental courses covered but two years with almost no educational preparation required for entrance. After that came the three year course with its low requirements for admission. Gradually these have been advanced to graduation from a four year High School course or its full equivalent. A few schools are already offering an optional four year course, and in another year it will be required in all schools. This prospective four year course follows the general line for which I am pleading today.

The history of other professional courses is interesting also. Not many years ago, requirements for entrance to medical schools were exceedingly low, and the course covered three years. Now it extends over four, and many of our better universities demand the equivalent to two years college work for entrance, while a few insist upon a bachelor's degree. Before we know it an additional interne year after graduation will be in requirement.

There are indications that the regular law course will soon cover four years. The University of Michigan furnishes an apt illustration. Their law course could be completed in two years up to a short time ago, as indeed everywhere else. It now covers three years. Formerly a High School certificate, or its equivalent, was sufficient for entrance.

Now two years' work of college grade is required at Michigan, and I assume that this University will soon require four years of law study for graduation. Such a course is now provided and students are strongly urged to take it on the ground that three years does not prepare a student for modern law practice. Harvard and Columbia law schools and a few others, as is well known, require that the student present a bachelor's degree for entrance.

I am referring to these other professional courses and schools, not, of course, to advocate that we follow their example in all details, but simply to indicate in a general way what our future action may be, and probably must be, and to recall to your minds the general upward tendency in professional schools as to entrance requirements and studies.

It is not a radical step we are advocating today. We pleaded not that our Association ratify the most stringent requirements of schools and universities, but simply that we adopt the policy already in force, or soon to be put in force, by the leading universities and colleges.

The particular problem of the time, and the problem in which all dental educators are interested, is, what shall be the content of the four year course?

It is logical to demand that the defects of the three year course shall be overcome and they have already been mentioned in part. Certainly a four year course that shall not correct each of the defects of the three year curricula would be inadequate. Before taking up in detail these four faults it might be well for the sake of clearness to restate them so that the subject may be kept well in hand:

(1). The three year curriculum is overcrowded.

(2). It has been found impossible to give the student a satisfactory knowledge of the fundamental sciences which tend to develop the scientific attitude of mind.

(3). It is not possible to give the student satisfactory training in the principles and practices of scientific dentistry.

(4). It lacks some of the modern influences possessed by courses leading to degrees in other professions.

The student is at present over-crowded with work in the three year course. This is so obvious that it requires no discussion. The condition obtains in almost every Dental School that is not hampered unduly by financial difficulties. A conscientious attempt is made to give the students the knowledge now considered necessary for the practice of the newer scientific dentistry. The following remarks do not apply to schools that have been skimping the time given to the fundamental sciences. The three year curricula at such schools are not greatly over-crowded, to be true, but this is because their curricula are incomplete. In the usual three year curriculum, too many hours are at present required, and this has a pernicious influence upon the mental habits and mental attitude of the majority of the students. They are given so much to do that it is practically impossible for the average ones to develop habits of thoroness. Being pressed for time a student is forced to adopt all manner of short cuts and thus develops a faulty mental attitude. In turn the attitude of faculty members with relation to the quality of work done by the student is inevitably influenced by the knowledge that the student is often asked to do too much. Realizing this situation professors are often forced to be lax, and common sense demands that they should be lax under these circumstances. The students discover for themselves that it is impossible to do thoro work, and they fall into slip-shod mental habits. The average student becomes quite unwilling to do painstaking and arduous work. Obstacles are avoided instead of overcome. In other words, the mind of

the student is not trained. Certainly it is not trained in scientific habits of thought and study. Our slogan should now be, "fewer hours and better work." The student should be given just enough work to keep him busy but no more than he can assimilate well. More should be expected in the way of mental discipline and exactness. The effect should be to develop the student into a constructive worker and thinker, and eliminate the undisciplined mental shirker.

The four year curriculum must fall into the old error of putting on too much additional work, where we would have the old situation unchanged and unimproved. 4800 hours are entirely too much. Careful analysis of the faults of the three year curriculum should serve as a warning to those who would overload the four years. The enthusiasm of some advocates of the four year curriculum has, I believe, led them into error. The best opinion is that approximately 4400 hours should be scheduled. Not more than 1000 hours should be required in the first and second years when didactic work predominates. There is a great danger of over-crowding the four years course from its very inception, a danger that must be avoided if it is to prove to be as beneficial to the profession as is hoped. It should be kept clearly in mind that it is impossible to crowd both a medical and a dental education into a four year course. And this should, under no circumstances, be attempted.

The second complaint generally made of the three year course is that it has been found impossible to give as thoro-instruction in the sciences underlying dentistry as should be given. A four year curriculum must remedy this fault. I need not remind you how wonderfully the scientific side of dentistry has grown in recent years. Certainly there has been no greater development in any professional science. Our Association has recognized this fact and has been largely instrumental in the development of the sciences by its activity in the research laboratory at Cleveland. Sufficient cognizance cannot be taken of this new work in a three year course. Adequate time should be given to the study of such underlying sciences as Chemistry, Materia Medica, Anatomy, Histology, Physiology, Pathology and Bacteriology, so that these may be mastered with at least a fair degree of thoroness. In the four year curriculum each of these sciences should receive due attention. X-Ray diagnoses and preventive dentistry are examples of a portion of the dental curriculum which was not included five years ago. Now these studies have become so important that they require much more time than has been allotted them.

Another reason why the teaching of the underlying sciences has not been so successful as it should have been is that the student fresh from High School is plunged directly into some of the most difficult and intricate sciences known to modern knowledge. The complexity of Anatomy and Histology may be especially mentioned in this connection. It is little wonder that the results obtained have not been so good as they should be. In the four year course it will be found possible to defer these studies until the student's mind had been prepared to grasp them with intelligence and with possibility of actually retaining the principles of these sciences. They will then become integral, living parts of his intellectual being. No four year curriculum should be acceptable to the profession which does not consider and seriously endeavor for remedy this second fault of the three year curriculum.

The third shortcoming of the three year curriculum lies in its failure to equip the students with enough finger skill in the so-called practical branches of dentistry. Manual dexterity is the gift of the few. The majority of students find three years too short a time in which to acquire the desired facility.

How many of our Dental Schools are

entirely satisfied with the ability of their graduates? It is an unquestioned fact that many dental graduates are much more clumsy, much slower to grasp a problem and much less ingenious than they should be. It takes time to acquire dexterity and skill in the application of correct methods of practice, and this ability cannot be crammed into the student. It requires application. It requires practice. It requires time. The longer a student applies himself to these practical branches of his profession, the more skillful he becomes. In this connection, the advantage of the additional year is self-evident. Four years' training in the study of dentistry is coming to be recognized by everybody, who understands the problem at all, as an absolute necessity.

The fourth criticism leveled at the three years course is that it lacks some of the broadening influence possessed by college courses leading to other degrees. It follows, however, that a four year curriculum will overcome this criticism. The most essential enriching of the special education would come if a good course in college English were added to the freshman year. Such a course, if properly taught, would give the student practice in thinking in an orderly way and expressing his thoughts, both orally and in written form, in a clear, correctly arranged and concise manner. This training in English would be of inestimable benefit to the student. Such a course is essential to a good professional course, whether it be in a dental school, medical school, law school or a school of agriculture.

Before going into a consideration of the reasons why a course in English should be included in the four year dental curriculum, I wish here to mention other courses which might profitably be added to the four year course. It is generally admitted that it would be a great improvement to add a course in Biology to the freshmen year. This course would not only have a broadening effect upon the mind of the student, but it would also train his intellect along scientific lines and give him the attitude of mind necessary to prosecute successfully the subject of gross and minute anatomy. A course in physics might well be added if it can be included without crowding the curriculum to the detriment of the more necessary branches. A course in the preparation of dental charts and drawings—call it technical drawing or what you will—would be of great value in giving to the student habits of neatness and precision, and it would also give him training in another valuable method of thought expression.

There seems to be little or no difference of opinion among most dental educators as to the value of adding these three courses: Biology, Technical Drawing and perhaps Physics, if there is time for a third subject. There is, however, a great deal of criticism of the plan to add a course in English. This criticism seems to me to be illogical. It is generally conceded that the dental student of today needs a good course in English at some time. It is recognized that he needs training in thought expression, both oral and written, and it is not denied that the thought expression of our dental students is on the whole miserably poor. Let us be candid in this matter. The spelling of our students is on the whole atrocious; the grammar and rhetorical form almost as bad. Even those who object to this work in English admit these facts. They agree that a course in English is essential, but they assert that this course should be given in the High School. They blame the secondary school for the present conditions and demand an improvement in this respect.

"But it is a condition and not a theory that confronts us." Tho the High Schools are faulty indeed in this matter, and altho they realize their shortcomings and are hoping to improve conditions, still such an acknowledgment of this

will not help us now. The professional school itself must train the student in thought expression, or he is very likely to go without it. In other words, a course in English is an essential part of the modern professional course, When the High Schools shall have solved this problem, then the schools of medicine, law, dentistry and engineering may discontinue the English course. At present the dental student needs a course in English. Consequently, there is nothing to do but to give it to him. Do not refuse it because in your opinion some other educational system is faulty.

It is not my intention to deny the refining, broadening and cultural value of such laboratory work as Operative and Prosthetic Technic or Crown and Bridge Technic. Such subjects have cultural value. They unquestionably train the mind as well as the hand. This course in English, however, will not only add to the mental equipment of the student, but it will give him also the ability to express his thoughts clearly and in an orderly way. And orderly expression reacts in bringing about orderly thought processes which are so important to any accurate, scientific technic.

This is practically an age that many suppose the English requirements of technical schools, engineering schools for example, to be less strict than formerly. In some respects this is true. With regard, however, to the study of English in its two general divisions, Rhetoric and English Literature, this does not hold good. The reverse is true. The English courses in the best engineering schools are said to be equal in character, tho perhaps not in variety, to the English course in the regular literary curriculum. A notable instance of this is found in the Massachusetts Institute of Technology. In this great school it is insisted that the student shall not only know engineering problems but he must be able to present what he knows in correct oral or written discourse. Courses in Public Speaking are also provided in the best engineering schools.

I do not belittle the cultural side of English. Every professional man should be a man of culture, and master of his own language. This much it is safe to assume. Such culture is of immeasurable value for its own sake and for the general satisfaction which it brings. But the plea here is for the utilitarian value of the subject. It is insisted that the ability to use one's own language and a knowledge of its best literature stimulates processes of thought. Of course, it is superfluous to argue that it is very largely, and very strictly by our words, that is, by the manner of the expression of our professional knowledge, that the general public judges us.

If a digression from our main topic be permissible, it is not out of place to say, in this connection, that, if it were possible to analyze closely this alleged deficiency in our High Schools it would be found to be to some extent imaginary. The High School buildings are better and are more completely equipped with teaching conveniences than they were ten years ago. The scientific laboratories are better equipped. The faculty members are better trained and better paid. But working against the influence of the High School and all the time lessening its efficiency, we have the ever increasing complexities and distractions of modern life. It is to be hoped that eventually the High School may be able to correct many of the linguistic weaknesses of the home and of the street. When this condition shall have been reached, then professional schools may well discontinue courses in English, but until then they must accept the responsibility of teaching English.

To be sure, no two dental schools can well be expected to adopt the same hard and fast curriculum. Each school should serve its own locality primarily and each has its own problems. Absolute uniformity in dental curricula cannot be ex-

pected and is not desirable. The four year course must not be so rigid that it will smother all individuality. No one professes to know what is absolutely the best dental curriculum. Certainly your essayist makes no such profession. The curriculum of any given school, however, cannot be considered satisfactory if it does not correct the four weaknesses of the old curriculum. This much may be insisted upon as a minimum and a premise.

As already stated the individuality of any school should not be interfered with when the four year course is put into operation, but if any such school be handicapped by shortcomings in equipment, faculty, or finances, and still propose to give a four year course, it must meet squarely and correct at least the four main objections to the three year course, or else be subject to severe criticism.

One plan, for example, proposes to increase the entrance requirements to one year of college work and then to give the usual three year course. There would be some gain in that, but it would overcome only one of the four faults named. It is obvious that it would not improve the finger skill of the student. It would not sufficiently improve his scientific knowledge, and it would do nothing to alleviate the present crowded condition of the three year curriculum. This plan is obviously insincere or ill-considered. It is a makeshift at the best. What control would the dental school have upon the character of the instruction in the pre-dental college year? What difficulties would not be encountered in the standardization of entrance requirements? Questions like these cannot be answered satisfactorily by the advocates of this plan.

Another scheme for a four year curriculum proposed by several schools is simply to increase the hours and extend the subjects already taught. This plan, to my mind, is much better than to require a pre-dental college year. Those who favor this, however, would deny the student the benefit of a course in College English. It is significant, however, that those who oppose the teaching of English in the Dental School stand alone in the entire educational field. The sponsors for this plan are also denying the student the training gained by a course in technical drawing and in biology and in some other studies. It is difficult to get precisely their point of view.

Other plans having obviously in mind only the best interest of the student have been published and they are seriously proposed by Dental Schools whose motives are entirely void of selfish considerations. Some of these plans are well thought out and contain many excellent points. A chief fault of such curricula, however, lies in the fact that they insist upon 4800 hours, which, in my judgment, is an insuperable objection. They do not make any attempt to alleviate the present crowded condition of the three year curriculum. Indeed it is more crowded than ever. Four thousand four hundred hours is unquestionable sufficient, if careful and painstaking work be insisted upon, if orderly habits of study are to be encouraged, and if a false slipshod mental attitude on the part of the student is to be avoided.

In conclusion, and by way of summary, it may be added that the Dental Educational Council of America proposes shortly to publish a detailed four years curriculum whose substance must be accepted by all schools that desire to receive recognition and a classification by that body. This curriculum will probably become standard in its essentials.

It is sincerely hoped

(1). That it will not crowd the student;

(2). That it will give the student more scientific information and a more scientific attitude of mind than he can secure from the present three year plan of study;

(3). That it will provide for a course in Prosthetic and Operative Dentistry, which will extend over the four full years so that the graduate may possess a larger degree of manual dexterity and finger skill;

(4). That it will require the addition of a general course in English, and that provision will be made for Technical Drawing, Biology, or Physics, or both.

It is also greatly to be hoped, and in my judgment, it is absolutely necessary that this curriculum shall allow a certain amount of latitude, so that local conditions may be met by various schools. No rigid, Chinese scholasticism will meet our needs. Variation from type and adaptation to different environments with a fine professional hospitality to various points of view, will be found compatible with high standards, broad culture and a unifying professional consciousness. Indeed some such degree of latitude is essential if we would achieve these desirable ends.

I feel that it would not be proper to close this discussion without referring to the responsibility the National Dental Association should feel and be willing to assume in helping to secure and maintain proper and reasonable standards in the field of dental education. The best means probably is by legal enactment in the different states, but even this oftentimes presents difficulties hard to overcome especially in large legislative bodies. In my opinion, the work of the Educational Council would be strengthened if its membership were more representative. As is well known, not all dental schools are members of either one of the two Faculties Associations now in existence, and some are not members of any organized educational body. Likewise, not all State Dental Boards are members of the National Association of Dental Examiners. All these interests however are represented in the membership of this body. From my years of connection with the Educational Council, and from what I have learned during this time, I feel safe in urging that the National Dental Association should now prepare to take over the work of the Dental Educational Council of America in order to direct its activities and become responsible for what it does.

We must be masters of our profession. We must have a larger measure of that professional and business efficiency upon which the world is now putting so large a premium. We must not trail the procession of the professions. We cannot stand still when the whole world is ceaselessly moving under our feet. We shall more and more be judged by the estimate we put upon ourselves. In the long run, the general public will value our profession as we ourselves value it. The rewards of life, individual and social, material and spiritual, are coming more and more, as they should, to those who know and do.

PRACTICE MANAGEMENT, BUSINESS INVESTMENTS, AND A DENTIST'S DUTY TO HIS PROFESSION, INCLUDING A CERTAIN AMOUNT OF ETHICS.

By C. N. Johnson, M. A., L. D. S., D. D. S., Chicago, Ill.

(Read before the National Dental Association, July 26, 1916.)

POSSIBLY the two factors which impelled your committee to assign this subject to me was because on the one hand we have in the past too frequently been presented with the spectacle of an elderly dentist approaching the years of his professional incapacity minus the wherewithal to live comfortably in his declining days; and on the other hand we have been confronted with the danger that in the effort to remedy this wrong and teach dentists good business methods there was a tendency to exaggerate the commercial to the almost utter exclusion of the professional in our relations with the public. No system of practice management can ever hope to be permanently successful which does not take into account the welfare of the patient as well as the practitioner. There must be full equity of justice to both parties else there can be no stability of confidence, and without confidence business relationships are wholly untenable.

With this premise firmly fixed in our mind we may acceptably consider the best means of managing a practice. I need not here discuss the question of fees, the methods of book-keeping or the collection of accounts, except to say that there are two cardinal principles involved in all successful business transactions, viz.—to collect accounts as promptly as you can, and to pay your bills as promptly as they are rendered. Never permit the incubus of debts to drag you down. It is not only bad business but it is an uncomfortable way of living. Your bills for professional service should be rendered promptly and regularly. By that is meant that on the first of the month following the completion of the service a bill should be mailed and if not paid by the first of the following month another should be sent. There are logical variations to every plan of procedure, but usually no month should be permitted to pass without a reminder of some sort that the bill is unpaid. If you keep your own books and send out your accounts you should revise your list of unpaid bills thoroly every month and establish a methodical follow-up system. If you employ a bookkeeper to attend to your accounts you should at least review her work once a month and direct her what to do with each account. Your intimate knowledge of the circumstances connected with every patient will enable you to more intelligently handle the individual accounts than can any outside person, and you must put intelligence into this matter, as with every other business relation in life.

Having established a system of collecting your accounts and paying your bills, the time will soon come when you will have some money to invest, and the manner of doing this will form the chief burden of my message to you today. In

this one thing dentists in the past have blundered more than in any other of their business transactions. The lure of the get-rich-quicker promotor has alas caught too many of our craft, and it is time that we as a profession called a halt on our weakness and began to use common sense in husbanding our hard-earned savings.

Without stopping to consider at this time all of the various and sundry schemes for separating the dentist from his money, I will discuss briefly some of the different kinds of investments which I believe will most acceptably meet a professional man's needs in this particular. Realizing that no one plan of procedure will meet the exigencies of every man's condition, I can deal only in generalities, and make suggestions which are more or less tentative, but which after all I am firmly convinced are fundamental.

I believe that ordinarily speaking the first investment for a professional man should be in a home, then in life insurance to protect his family. These should be considered investments not so much for profit as for protection, and this form of investment is more obligatory on a man than any other. I have heard the argument used frequently that it is cheaper to rent than to own your own home, but even if it can so be figured on paper it seldom holds true in fact. Usually the professional man who has accumulated anything worth while has at one time or another owned a home. Aside from the consideration of finance there are sentimental reasons why a professional man will do well to own a home. Home ownership anchors a man to a community in a more substantial way than anything else. He is a more responsible citizen with a keener interest in community affairs than if he is merely a tenant. As to life insurance it is frequently the sole barrier between one's family and want in case of a sudden taking away of the head of the home. And yet I would not advise the form of insurance which compels a man to pay during his life time, and which is collectable only in case of death. This frequently works a hardship on a man in his last days at a time when the burdens of business should be eased. An endowment policy which matures in a given number of years, and can be realized on at a period of life when the beneficiary is supposed to have learned how to invest his money, or mayhap when he needs it to live upon, is preferable in every way. This brings the burden of meeting premiums in the productive time of life when it can best be borne, and the maturity late in life when it is most needed. Meanwhile your family is protected against want.

When it comes to the investment of money for profit, in other words investing your money so that it will make more money for you, it requires the very greatest care not to make mistakes. No plan is infallible, and no system absolutely safe, but there are several forms of investment which seem to your essayist to be more suited to professional men than any others. First mortgages on approved real estate is one, old standard dividend—paying stocks is another, and bonds another. As for mortgages, they must be selected with care on property the value of which you have certain knowledge, either at first hand or thru some real estate appraiser of repute.

Stocks should be dealt in conservatively and cautiously—always as an investment and not a speculation. By that is meant that the professional man should not buy or sell stocks on a margin. Aside from the constant risk of loss there is the inevitable diversion of interest from professional duties. No dentist can do good work at the chair while his mind is on the stock-ticker, and few dentists can afford to either win or lose in this kind of a game. The den-

tist's money is too hard earned to lose in such a manner, and the psychology of the situation is such that it is dangerous for him to win. If a man who earns his money as slowly and laboriously as does a dentist suddenly makes money by speculation, it is not within the power of human nature to convince him that he cannot make more the same way. He takes "flyer" after "flyer" till the inevitable result is that he quits a loser instead of a winner. Many a professional man has wrecked his future in this way. If stocks are bought they should be paid for outright and the certificates placed in the safe or safety deposit vault; then if there should be a slight fluctuation the buyer is not disturbed by it. There is no objection to a dentist making money in stocks by buying when they are low and selling when they are high, and this can frequently be done by keeping one's head and not being too anxious to make large profits. In a general way the time to buy is when everybody else has gone mad and sold in a panic on the theory that the whole country has gone to destruction. There is invariably a period of stagnation after such an event when the observant buyer can pick up some stable stocks at a very reasonable price. Conversely the time to sell, if you sell at all, is when the frency of speculation has carried all stocks beyond their actual value, and the public seem to proceed on the theory that there is no limit to the advance. Remember that in stocks as with everything else there is a sane level to be reached some day, and the man who has not compromised himself by buying on a margin can afford to wait.

But after all, in the opinion of your essayist, the very best investment for a dentist is bonds. This sounds like tame advice. In truth there is little excitement about dealing in bonds, neither are there sudden or enormous profits. But for safety and convenience, and for steady and certain income there is nothing to compare with bonds. And in the long run what seems to start out slowly will after a few years begin to accumulate very rapidly.

Let it always be understood that as interest on mortgages, dividends on stocks, or coupons on bonds mature and come into your possession, you should no more think of using them for current expenses than if they did not belong to you. They must always be looked upon as a fund entirely separate from an expense fund. You paid your expenses without them before, and you can do it now. These profits on your investments should invariably be reinvested so that they in turn begin to make more money for you. It is in this way that bonds eventually turn out after all a very rapid way of making money, and the accumulations in a few years begin to mount up in a most surprising manner.

A man prominent in the business world and one who is accounted a very successful one said to me a short time ago that if he had started in at twenty-one years of age and invested his money, as he made it, in bonds, and continued doing this till now he would have been much better off financially than he is. And this man in all his various business enterprises has never had a failure charged up against him. It is simply that as a sure and steady profit investment he would have found bonds better than some of his business enterprises or other forms of investment. For professional men at least bonds seem to me to be the most ideal of all the safe kinds of investment, and I wish strongly to recommend them to my colleagues. But I do it with this proviso—that no dentist shall trust to his selection of this kind of securities. In fact in making any kind of investment it is the part of wisdom to consult your banker or other conservative and confidential business man. Select some one in your community who

has a reputation for sturdy honesty and good business sense, and submit your investments to him before you put your money into them. There are the best of reasons for doing this. He knows more about the investment game than you will ever learn, and he will be only too glad to give the benefit of his years of experience. What would you think of your banker or bond broker if when he had something wrong with his teeth he should try to treat them himself? Is it not just as logical for you to consult him about investments as it is for him to consult you about dentistry? The reason why most dentists do not care to consult bankers about investments is because the banker is likely to suggest something which has no alluring promise of enormous returns, and this does not appeal to the get-rich-quick fever in the blood of the average dentist.

One other practical suggestion about investments in a general way is not to invest everything you have in any one commodity or enterprise. Remember the fundamental fact about investments is this, that no one is infallible. The most promising enterprise may fail, and it is frequently the unexpected that happens. This is so fundamental that it is recognized in our federal banking law. The government limits the loan by a national bank to any one individual to ten per cent of its capital and surplus, thus acknowledging the possibility of failure on the part of the borrower no matter what his apparent financial standing may be.

And this brings up the very first lesson an investor should learn—that once in a while he must pocket a loss. Let him be as cautious as he may, yet at times he will be confronted with a failure of some of his enterprises. And the thing to do when a loss comes is to swallow it and smile. It is never a pleasant dose but it is seldom turned sweeter by making a bad face over it. Remember that you made your money in the first instance "out of the air," and the air is still here. Useless whimperings never yet brought back a financial loss, but a bright courageous acceptance of the inevitable often starts a man on the road to financial recovery.

I attended the funeral the other day of a man worth millions. He had started a poor boy and had accumulated a fortune. Financial panic came and swept him off his feet, leaving him in debt at least two million dollars. Every one predicted that he would never recover, that he was down and out financially for all time. Every one except himself. He simply said: "Give me time and I will pay everything." He did. Not only that but he made more millions after his failure than he had ever dreamed of having before. Repining over his losses would never have brought that man back to his feet again, and repining will never profit any man, even a modest investor like a dentist.

The latter part of the topic assigned me should really have been the large part. "A dentist's duty to his profession" contains enough to make an entire paper, but I must content myself with merely a brief reference to it. When a man is graduated from a dental college and thereby assumes a professional status in the world he tacitly accepts a double responsibility. In addition to the duty which every man owes to his family and himself, as intimated in the consideration of business methods, there is a finer and I sometimes think a higher obligation revolving upon him in his attitude toward the profession and the public. To properly practice a profession means much self-sacrifice. The dollar should not be the dominant factor in professional life—important as the dollar is—and no man who permits the dollar to dominate his every action should assume to take rank as a truly professional man.

A dentist's duty to his profession implies a willingness on his part to sink himself in the common weal of the profession. When called upon to aid in any capacity where professional advancement is at stage he should never hesitate. To him should be ever present the conviction that no matter how much he does for dentistry it will not be a tenth part of what dentistry has done for him. This obligation which he owes to the profession should always be to him a very real one, and he should not content himself with a mere observance of the letter of the obligation but should heartily enter into the spirit of it.

A close following of the real essence of professional ethics should be the key note of every man's professional faith. without it there is something lacking in the individual, and no other one quality will ever compensate for this lack. It need not be thought for one moment that there is anything incompatible between a strict observer of professional ethics and a businc ss-like management of a practice. Ethics means the science of morals, and a man may be moral and make money. In fact he can scarcely be moral in the highest sense, without at least making sufficient money to protect his family against need and himself against dependency. A man may be a good man, and not be a conspicuous success financially, but he must at least be able to pay his bills with reasonable promptness, or else he does not measure up to what I believe to be, a truly ethical man.

The practitioner whom I believe to be ideal is the one who in addition to having a high moral sense so far as professional obligation is concerned, combines with this a keenness of business acumen sufficient to conserve his material interests and make him independent in his old age. And this combination is one not at all impossible of achievement by men of even average ability if they are willing to conscientiously devote their energies to a consummation of the task.

It is the average man we most wish to reach. The exceptional man needs no direction at our hands, the hopelessly indifferent or incompetent—well I like to think that there is none of that class in dentistry, but if we have any we cannot reach them by argument or persuasion. The only thing we can do is to pray for them, and I greatly doubt that even that will save them. At least let us pray.

THE ROOT CANAL PROBLEM, ASEPSIS AND STERILIZATION.

By B. E. Dahlgren, D. M. D., Associate Professor of Theory and Practice, College of Dentistry, University of Minnesota.

WE HAVE had the evil effects of apical infections strikingly put before us, thanks especially to Dr. Hartzell. Whether or not this alarming picture in all its novelty seems painted in colors somewhat too vivid we cannot be indifferent to it. If the main contention for focal infections of dental origin were reduced by ninety per cent it would still be highly important. As it is, it stands accepted and unassailed.

With the recognition of the infected tooth apex as a primary focus for metastatic infections the pulpless tooth with its root canal problem has acquired an increased significance. While it has become more than ever our task to deal with established foci, it must at the same time plainly be our endeavor to prevent the occurrence of such infections. A critical examination of the state of our understanding of this matter would be timely, but it would be a rather large undertaking. I wish here only to touch upon various aspects of it and to emphasize the phase of it which in the daily practice of dentistry takes precedence over all others. Incidentally I wish to point out the need for certain definite knowledge.

From a direct, practical point of view, the most obvious facts in connection with the root canal problem are two. The infections are caused by bacteria, and the root canals furnish the main path by which they become established at the root apex. This is a very simple assertion which may not contain the entire crux of the matter but as a basis for a working theory it will serve to carry us far toward a solution.

To dwell on the importance of relatively minor paths of infection will not at the present stage directly advance the main problem. To accept without distinct proof the claim recently made by Ulrich that periapical infections are pre-eminently of hematogenous origin is to obfuscate the whole question. The dentist's responsibility can not be so readily disposed of. Evidence that such a claim should be admitted even to the extent of a third, as conceded by Dr. Grieves, has to my knowledge not been presented. The matter is capable of direct experimental investigation and this should be awaited before we accept as a guide to action a thesis which leads to a chaotic reversal of our present practice of the largest possible measure of conservation of the teeth.

The degree to which a **locus resistentiae minoris** is produced by pulp removal is certainly of considerable moment and is a question which together with the matter of cryptogenic infections deserves to be closely investigated, but I wish to dismiss it for the present as a matter of secondary import.

We cannot prevent the occasional infection of the pulp of an intact tooth, whether the bacteria enter by way of the apex from a more or less infected gingival crevice, or arrive from a more distant port of entry by way of the blood stream, or, as suggested by Nie-

dergesäss, they grow in thru the fine cracks of the enamel that are to be found in nearly all teeth. In dealing, however, with sound teeth to be devitalized, teeth with exposed pulps, or even perhaps with pulpless teeth, we are, let us hope, by no means so impotent as would appear from the recent confusion of opinion on this subject.

For the purpose then of optimistic attack on the root canal problem, I would maintain simply that asepsis in pulp extirpation and thoro disinfection of the canals of pulpless teeth are the two effective measures of primary and cardinal importance, and that it is necessary to act on this basis. Infections being but another word for bacterial invasion and the root canal of the pulpless tooth the open path to the apex, it must be **sine qua non** of all our canal operations not to plant bacteria at the apex and it must be the direct object of all our treatment of infected pulpless teeth to destroy the bacteria which have arrived in the canals and have established themselves in the dentine of the root.

It may, of course, well be questioned, whether there ever are infected canals of any standing without an accompanying invasion of the periapical tissues. It becomes then desirable to destroy the bacteria which have found their way beyond the apex, as far as this may be done. Ionization has been recommended for the purpose. Its effectiveness can readily be determined.

It is stated on good authority that the idea of asepsis is of rather recent appearance in dentistry. It is at any rate a subject which has not been over-emphasized. The question of how it may be attained is well worth discussion. In the first place it is necessary to realize fully what asepsis in root canal work implies. Even with the saliva perfectly excluded and sterile canal instruments at hand it is not at all easy of attainment, for the field of operation is in most cases thoroly infected. All surfaces of the teeth upon which we operate are coated with the very bacteria which we must not introduce. The walls of the cavity are infected, the roof of the pulp-chamber is infected and with a living pulp beneath easily defines sterilization in the short time allotted to such operations. One touch of the broach to the infected dentin at the entrance to the pulpchamber before the instrument is carried to the apex or beyond, and the mischief may be done. There is also the infected debris produced by the bur in opening the pulp chamber. This consists of minute particles difficult to get rid of when churned up with pulp tissue and apt to adhere to canal instruments. The pulp itself may be more or less infected and contaminate the broach. It is thus evident that our technic for pulp extirpation must provide for the sterilization of the field of operation as well as for the employment of sterile instruments. Flooding the pulpchamber with corrosive sublimate alcohol or formalin before removing the canal contents after arsenic devitalization, is advised by German writers. Efforts should be made to work out a satisfactory aseptic technic which can be taught with precision and generally followed.

It might seem tedious to discuss such a simple and familiar subject as the sterilization of instruments. There is, however, one practice in common use that is not to be relied on, viz., the momentary immersion of a contaminated broach in a germicidal solution. It is, to be sure, an admission of deference for the idea of asepsis but beyond this symbolic significance it has little value. According to a recent bulletin of the United States Public Health Service which agrees almost precisely with the statements of Dr. Miller in his papers of 1891 and '93 on the subject of asepsis and antisepsis in dental practice, the sterilization of dental instruments can be accomplished by immersion in phenol solution for 15 to 45 minutes, a 5% solution being more efficient than pure phenol.

Since we cannot stop to examine for sterility after fifteen minutes the outside limit must be accepted if we wish to use phenol to this end.

The most expeditious and reliable method of sterilizing canal instruments is unquestionably by heat. According to Hasseltine, the author of the bulletin mentioned above, immersion for three minutes in boiling water or in water of a temperature of 80 C, will kill all but the most resistant spores. Inasmuch as we are not especially concerned with such spore-bearing bacteria but particularly with Staphylococcus and Streptococcus, three minutes of boiling seems all that is needed and anything beyond may be considered a margin of safety.

I wish to point out that this is readily accomplished also at the time the broaches are required and during the progress of canal operations, and that it is often indicated, even if the broaches have been previously sterilized, especially if they have been kept in the ordinary way. An evaporating dish or similar vessel over a burner on the bracket table, or near by, will enable the operator to use with confidence the same broaches over and over again in the same operation. This recommendation is the by-product of certain experiments on root canals where absolute asepsis had to be preserved in order not to vitiate the results. To consider broaches sterile because they are new and have never been in infected canals is an error, tho it may have been found that new broaches are seldom contaminated in their packages. To regard broaches which have not been kept in a strictly aseptic manner sterile because they were once sterile, betrays a lack of appreciation of bacteriological requirements. A bacteriologist who would keep his platinum needle in a drawer and not flame it at the moment it is needed for use would be an impossibility in the laboratory. We are decidedly at fault in our practical application of bacteriological science unless we realize the necessity of observing its strictest injunctions in the minutiae of our technic.

Sterile canal points such as are obtainable, and wrapped, pre-sterilized broaches can in most cases be made to obviate the necessity for the sterilization of the fingers for the wrapping of cotton. However, if the sterilization of the hands can be accomplished for the purposes of major surgery (see e. g., Miller, Dental Cosmos, p. 1, 1893) the superficial sterilization of the tips of two fingers for the wrapping of broaches should offer no special difficulty when the need arises. Fluids can be carried by means of tweezers which may be flamed.

Ordinarily we sterilize instruments to prevent carrying infection from one patient to another. In canal operations we must in addition avoid infecting the patient with the bacteria of his own mouth. The ritual of the surgical operating room cannot readily be adopted in the ordinary routine of dental practice, nor is there any necessity for it except in certain small matters. Asepsis in canal operations, however, requires a carefully worked out technic, varied perhaps to suit individual requirements, but always with the strictest adherence to correct principles.

In the treatment of canals which are already infected we must necessarily resort to germicidal agents and give them time to act by sealing into the canals dressings of such substances of more or less potency. This is repeated two or more times, till it is considered that the canals are sterile, when they are filled. I do not know what percentage of treated teeth show abscesses or absorption at the apex, I believe it has been stated to be about 70%, tho this figure seems extra-ordinarily high, nor how many of these pathological areas revealed by the X-rays existed before treatment of the canals was begun, but it is certain that after a varying number of treatments canals are being stopped up whether

sterile or not. There is, of course, a crop of trouble.

How is this to be avoided, and how are we to determine whether canals we have treated are sterilized and ready for filling? The clean appearance of a dressing which has just been removed can be no more than a rough guide. Odor indicates the presence of large numbers of odor producing bacteria, e. g. Bacillus fusiformis or a variety of bacteria of putrefaction, and while its absence is of a certain value as an indication of expectation it is absolutely no criterion of sterility. Are we then to make a bacteriological examination of the condition of the canals in each case and terminate treatment only when the findings after a certain tire are negative? This may conceivably be found desirable and would involve no special hardship to those who have had a slight degree of bacteriological training, but it would be vastly preferable if some reliable standard of procedure could be determined which followed by any operator would insure the disinfection of infected roots.

The formulation of such a method, which should be unquestionably efficient and which should meet the requirements which are imposed by way of restrictions in dealing with living tissues contiguous, may be impracticable, but can evidently not be an entirely empirical matter. Procedures which have only been found at times or usually to give satisfactory results should if possible be replaced by such as can always be depended on. A thoro knowledge of the bactericidal action of available agents as applied to this very purpose is a requisite and here we must have recourse to some actual investigation.

It may possibly be found that root canal fillings are a far less important matter than at present appears. Not that they can be a negligible factor, for a leaky filling over an imperfect root canal filling, or as is often enough seen in certain molar canals, no filling at all, furnishes evidently a perfect route for infection, but as long as we must depend on root canal fillings to prevent the sort of reinfection which Mayrhofer found to occur within two to ten weeks in the canals of nearly all of some five or six hundred teeth once apparently sterilized by formo-cresol, so long will root canal fillings be an exceedingly troublesome matter to the dental profession. This remains true tho some men of eminent repute are able to fill all canals perfectly. The extent to which the dentin of the root becomes infected, the degree to which it can be disinfected, the role played by accessory canals, are subjects for inquiry in this connection. A study of what actually takes place in an unfilled apical end of a canal in a sterile root would be of much interest.

There is in particular one requirement besides satisfactory bactericidal performance, which must be met by any method employed for sterilizing canals. Dr. Grieves has in a recent paper laid stress upon it, viz., the tissues at the apex and concerned in the attachment of the tooth should not be injured, or at least not permanently lowered in vitality. Whether thoroly infected roots can be disinfected at all without injury to apical and peridental tissues still remains a matter of opinion. These and allied questions can of course only be definitely studied by experiments designed for the purpose. They must be animal experiments and they must be in rather large series in order that the results may be reliable or even at all valuable. The only account of studies of the kind which seems to have appeared in dental literature is a brief preliminary report by Römer of a few miscellaneous operations on a monkey.

The problem of the pulpless tooth is clearly enough defined. A solution must be based on actual definite knowledge of the factors involved. Opinions and discussions of clinical observations may help and may bring out new points for inquiry, but what is really needed is a

thoro investigation of the subject in all its ramifications. In order not to be open to the charge of empty preaching I wish to state that a report of a series of experiments on sterilization of infected canals will follow.

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FIXED APPLIANCES.

By Frank M. Casto, M. D., D. D. S., Cleveland, Ohio.

(Read before the National Dental Association at its Twentieth Annual Session, Louisville, Ky., July 25-28, 1916.)

I WONDER how many of the Dental Profession are acquainted with the **fact** that most of the recent developments, in orthodontic appliances, are along the line of fixation of the appliance in whole or in part for the more accurate and positive control of forces for moving the teeth.

In order to establish in your minds certain facts relative to the subject of **Fixed Appliances,** it will be necessary to define certain **principles** in physics which are involved in the efficient use of any appliance.

The first of these principles relate to a law in physics which has been repeatedly used in orthodontia literature, namely: that in the application of force, action and re-action are equal and opposite. In orthodontia this law relates to **anchorage resistance** to applied force, it also relates to the securing of greater **resistance** of the **anchorage** than at the points of the delivery of force, or at times the careful balancing of applied force and anchorage, as in Reciprocal Anchorage.

The **efficiency** of appliances in the **accuracy** and **delicacy** of manipulation, and the **positive control** of force and **anchorage** are all embodied in the development and working out of the finer points of the principles of **fixation** in orthodontic appliances.

These principles relate directly, back to the **elementary principles** of Physics and Dynamics, especially in relation to the control of Applied **force** and the resistance of these forces in anchorage and tooth movement.

The fixation of any appliance refers to its relative **stability** according to the proper use of the same or to opposition of force and resistance of anchorage and at the points of delivery of forces for moving teeth.

The **principles** of fixation then, should include **all** of the features which relate to the **Stability** of Anchorage bands, the size, shape and position of the Anchor teeth, the number of teeth included or involved in the anchorage; the kind of force to be applied and the type of anchorage used; the methods of re-inforcing anchorage to make the delivery of force more positive, and the direction in which the force is to be applied or resisted.

It is almost axiomatic that the more factors of fixation any appliances used in the mouth includes, the better mechanically it will be, because it will the nearer approach the mechanical perfection which has been developed and can be obtained outside of the mouth.

This immediately classifies any appliance in reference to its relative **stability** so that we can say with positiveness that "Fixed Appliances" are the more nearly perfect of any appliance utilized for Orthodontic Treatment and "Purely Removable Appliances" are the farthest re-

moved from that mechanical perfection which the necessary control of force and resistance demand.

You are probably all aware that in the evolution of modern Removable Appliances, they are conforming more closely to the principles of fixation by adopting many of the methods in use for anchoring Fixed Appliances and for securing greater stability of the Appliance as a whole. Hence the Removable Appliance will become more efficient and useful as it approaches the mechanical perfection of the Fixed Appliance.

The available means for applying force in tooth movements are: The screw, the lever, the forces of elasticity as exhibited in the Spring, stretching of wire, and the elastic force of rubber, and their various combinations. These can only be applied by the use of Fixed Appliances. Any appliance that does not permit of the use of these forces and their combinations is weak in proportion as the various forces are eliminated.

Hence, it is that the Scientific inclined mind will naturally turn to, or be attracted by the use of the more perfect and scientific combinations of appliances for treatment which are embodied in the term "Fixed Appliances." Such persons will invariably look for, and truly appreciate all of the various means whereby the principles of fixation may be obtained in a given appliance and will instantly observe and criticize these elements of instability about an appliance which render the anchorage **unstable** or the application of force **improper.**

A fixed appliance is one in which the anchorage for the appliance is fastened securely to one or more teeth, usually by cement. Those parts of the appliance at the points of delivery of force may also be made fixed in case bodily movement of the tooth is desired and a less stable attachment may be used when you want an inclination movement of the teeth.

The fixed appliance is much more universally used than any other form of appliance and seems best adapted for the treatment of most cases of mal-occlusion.

There are many things to be considered in the selection and application of an appliance for the purpose of performing an orthodontic operation. An appliance should be sufficiently **strong** to do the work expected of it, yet it should be as **simple** and delicate as is consistent with its requirements. It should be as **inconspicuous** as possible tho not to an extent that efficiency of action will in any degree be interfered with. It should also be constructed with the idea of **cleanliness.**

One of the most important things for consideration in an orthodontic procedure is the anchorage. When it is desired to move a tooth or teeth in any one of several directions it may be accomplished by exerting force upon them by means of mechanical devices known as appliances. I previously mentioned that according to the law of physics when force is applied to move an object, action and re-action are equal and opposite. It therefore becomes necessary to select the teeth which are to be used for anchorage with very great care, and with the understanding that the resistance of the anchor teeth must be greater than that offered by the tooth or teeth to be moved. Anchorage has been defined by Dr. Pullen, as "The Resistance selected as a base from which force is to be delivered for the movement of the teeth."

Various authors have made a diversified classification of anchorage, but I believe that the manner in which Dr. Angle deals with the subject, which is remarkably clear and simple, will best serve the majority.

This authority states that "An accurate knowledge of the forms and surfaces of the teeth and their occlusion, the surfaces, lengths, and inclination of their roots, and the structure, density

and distribution of the peridental membrane is essential to an intelligent application of the principles of anchorage."

"The degree of resistance offered by different teeth varies greatly, according to the position, size, length and number of roots, the direction from which force is exerted, and in the manner of mechanical attachment to them.

"The sources at our disposal for securing anchorage of resistance are, first, the teeth themselves, and second, sources external to the teeth. Anchorages may be classified as Simple, Stationary, Reciprocal, Inter-maxillary and Occipital."

One might use the terminology of Dewey, such as, "intra-maxillary, inter-maxillary and extra maxillary" advantageously as distinguishing between anchorage secured inside of the mouth and anchorage secured outside of the mouth. I will give you a very brief description of each form of anchorage. (Angle Classification).

A **Simple** anchorage is one in which the anchor tooth or teeth are sufficiently strong to resist the reaction in the movement of a tooth or teeth without themselves being moved or misplaced. The attachment of the appliances in these cases is such as will usually allow of a hinge movement.

A **Stationary** anchorage is one in which the appliance is so constructed as to prevent as near as possible any tilting or tipping of the anchor tooth, and if the tooth moves at all it will move practically en-masse thru the process. This form of an appliance gives a great deal more strength and resistence to the anchor tooth.

A **Reciprocal** anchorage is one in which certain mal-posed teeth are pitted against other mal-posed teeth. This type of anchorage has a more universal use than any other. In fact, there is some use for it in the treatment of most every case of mal-occlusion.

The **Inter-maxillary** anchorage is one in which the teeth in the one arch are used to overcome the resistance necessary to move mal-posed teeth in the opposite arch.

Occipital anchorage is one in which the top and back of the head are used for anchorage.

By a close study of this classification and unlimited combinations available one can apply the principles to practically any case of mal-occlusion and to any form of fixed appliance.

I think that every Orthodontist is conscious of the fact at all times during the treatment of a case of mal-occlusion that the anchor teeth must and should be very carefully watched. Yet I think many failures result because of careiessness on the part of the operator, or perhaps a better explanation would be the operator's inability to recognize or determine the amount of stress or force the anchor teeth will stand.

The materials for the construction of **Fixed Appliances** has much to do with the principle of **Fixation** as any other factor, for example; an appliance constructed of the noble metals will never disintegrate, its temper will always remain even tho attachments be soldered to it, and its integrity will never be impaired by use in the mouth. On the other hand, an appliance constructed of base metals disintegrates to a certain degree in the mouth, loses its temper thru soldered attachments, and by the action of the oral fluids its integrity and usefulness is often seriously impaired. For this reason I am using gold, gold-platinum, and iridio-platinum, and their various combinations.

A great deal has been said as regards the use of noble versus base metals in the construction and use of orthodontic appliances. While I don't wish to make a lengthy discussion regarding the merits and demerits of each, I do wish to

say, and emphatically too, that I am unalterably in favor of the noble metals.

During the fourteen years that I have been actively engaged in the practice of orthodontia, and regardless of the arguments otherwise, I have failed to find a single quality (except cheapness) that would recommend base metal in preference to the noble metals. In my case I would eliminate cheapness of materials, because I can make, fit and adjust an appliance made of noble metals so much quicker than one made of base metals that the saving in time alone is more valuable than the difference in the cost of the materials.

It is also much easier to remove a noble metal appliance without distorting it, and easier to make any new attachments, and in many cases the bands that have been used for the operating appliance can be used for the retainer. The noble metal appliance is more easily cleaned and kept so by both the patient and the Orthodontist.

I wish to take issue with the statement that has frequently been made, that bands made of Iridio Platinum will cause disintegration of the enamel of the tooth next to the band. That is not true in my practice, and I don't see how it could be true in the practice of any orthodontist, if proper care has been given the mouth and teeth.

One argument frequently advanced in favor of the use of the base metals, especially German Silver, is that when the metal is in contact with the saliva a certain length of time a chemical action takes place, which produces certain salts, which acts as an antiseptic in the mouth and thus prevents or at least retards decay of the teeth. If it is true that an antiseptic is thus produced sufficient in quantity and strength to be of any value, then the use of German Silver would be all the more contra-indicated, because the fact has been well established that any solution with antiseptic qualities strong enough to be of any service will also be strong enough to inhabit cell activity and interfere with function. If the use of such a solution is persisted in a degeneration of the tissues will follow, and an inflammatory condition result.

If you will pardon me for a moment's digression I wish to say that in my practice I consider the proposition of keeping the mouths of the patients clean during an orthodontic operation as one of the most essential and vital parts of the procedure. A considerable part of the time allotted each patient at each appointment is devoted to the care of the teeth and soft tissues, and at least once a month the patient is given a thoro prophylactic treatment by an associate I have in my office for that purpose. At such times an examination is made for cavities and defects of the teeth, and if any are found the patient is immediately referred to the dentist for his consideration.

A regular examination blank for this purpose is used, this is made out in duplicate, the original is given the patient, parent or guardian with the request that it be taken to the dentist, and the copy is filed with the patient's record card. The same method is used when beginning an orthodontic operation. The reasons for so doing are obvious.

To return to the main theme of my paper, namely; Fixed Appliances, the evolution of the highest type of the modern appliance shows a gradual addition of positive methods in the control of force and resistance, so that the neglect of any feature of stability will impair the integrity and efficiency of the appliance just to the degree as these features are omitted. Again, the physiological development of the dental arches is best produced by the following out of the principles of Fixed Appliances.

In contrasting other features of efficiency of the Fixed versus the Remova-

ble Appliances, it may be stated that the Fixed Appliance has been perfected to a higher degree and will thus exhibit a greater degree of efficiency.

Second.—By far the greater number of mechanical principles may be embodied in its construction.

Third.—There is more stability of anchorage.

Fourth.—Force can be more definitely and accurately applied in tooth movement.

Fifth.—Its development has been more scientific and its application for moving teeth more universal.

Sixth.—It is more delicate in its construction, and will interfere less with function.

Seventh.—Its continued and satisfactory use by a large majority of Orthodontists.

Eighth.—It is said "that the proof of the pudding is in the eating," so is this true of the Fixed Appliance. It is safe to say that the beautiful and almost miraculous results universally obtained by its use could not have been accomplished by the use of any other form or type of Appliance.

In conclusion, I wish to impress upon you the vital importance of the principles of **Fixation** in the **Fixed Appliance,** upon **which** the greatest argument for its use is based and in the following out of **which** principle the success in treatment is assured. The principle of Fixation is therefore, a **foundation principle** in orthodontia, which I have attempted in this paper to bring to your consideration in contrasting the Fixed and Removable Appliance, for it seems to me, that it applies the supreme test of efficiency in this respect, and, therefore, indicates to you the proper type of Appliance to select for the treatment of mal-occlusion. Before closing I wish to thank Dr. Pullen, of Buffalo, for his friendly discussion of this subject with me, and for the many valuable suggestions he made.

SOME THOUGHTS ON THE PHYSIOLOGICAL FUNCTION OF HUMAN TOOTH FORM.

By James Mark Prime, Omaha, Nebraska.

(Read before the National Dental Association at its Twentieth Annual Session, Louisville, Ky., July 25-28, 1916.)

WHEN we consider the progress our profession has made in the past 30 years—when we review our dental literature and history, we are forced to realize the fact that to one man we owe much more than to any other. Thru his untiring work during his lifetime, the profession forged ahead more than at any other time in its history. His work on dental anatomy and nomenclature are among his contributions and can be considered no less than monumental, and we acknowledge our deepest and sincerest gratitude for the fruits of his long years of labor. I speak of Dr. G. V. Black. I wish also to acknowledge my sincere gratitude to Dr. A. D. Davis and Dr. Charles E. Woodbury, with whom I have been constantly associated for many years and from whom I have received much assistance and encouragement.

We read among the first statements of the Mosaic record of creation that the earth was without form and void. It was void because it had not form. Form is a necessary physical attribute of many things material. We speak of form as that necessary attribute of all objects—that line which bounds the periphery of material things. In the inorganic world we find form less definite, more transient, and not so essential to the object. In the organic, we find form becoming an essential attribute and may play an important role in the survival of the organism.

We might say, from our viewpoint, we see no reason why the tree should not grow a square trunk, and, for economic reasons, we might wish it were so, but, we would dislike to apply the same rule to our heads. In a general way, form is an essential to all members of our bodies. Yet with the great majority, we are forced to admit a wide latitude of variation without serious disturbance of function. Were we to consider the external ear, we would be compelled to admit its form would at once indicate its design to gather from the ether, sound waves, yet scientists have failed to discover that a definitely formed external ear is absolutely essential to auditory function. We are compelled to the facts that our sense of smell is not governed by the size or form of our nose. It might be a Roman nose or a flat nose and not in any way effect our olfactory sense. We see very learned men and women with a great variety in size and shape of heads. We may see a president wearing a six and three-quarter hat and a mule-driver wearing a seven and seven-eighths. Thus we see outline form contributing in a general way, only, to the function of the organ. In no other organs of our entire bodies do we find form so important to the life and function as in the teeth. Form is an attribute of the teeth in a highly specialized sense.

Let us look at some of their cardinal form characteristics in relation to their most important function—that of occlu-

sion. We see occlusal form beginning to functionate very early. Its pointed cusps and blade-like edges, serving, under the subtle force of eruption, to guide the teeth thru the tissues. As soon as they pass thru these tissues and come in contact with each other, they are guided, by their incline planes, to their normal position in the arch. This function of the incline planes is operative to maintain them in their normal position. In later life, by extensive use or malposition, the teeth lose their cusps and incline planes, they lose, in a measure, their function and usefulness. When restorations are made, involving the cusps and incline planes, insufficient care and thought is usually given the operation. Loss of these incline planes, many times, cause movement of the teeth. Their restoration will require tooth movement—tooth regulation. A surplus of material must be left on these planes and carefully watched and trimmed as the teeth are restored to their normal position, restoring, thereby, normal contact and occlusion.

During the last few years our literature has contained much discussion of the restoration of occlusal form. May I say, some extreme and erroneous ideas have arisen. One I might mention is the extreme carving practiced by some operators, under all conditions. There can be nothing gained by carving beyond that, which, under the existing conditions at that time in that mouth, are found. For example, we have a case where the cusps are almost entirely worn away. It is out of harmony and entirely useless to place a tooth with sharp cusps along side of these smooth, cuspless teeth. To explain further, should an upper and lower molar be extremely carved and placed in occlusion in a mouth where the cusps have been worn away, the results will be to destroy their investing tissue, because these two teeth are insufficiently strong to re-establish the mandibular habit possessed by the patient when all the cusps were present. As the cusps are lost, new habits of chewing are established and much wider lateral movement of the mandible is permitted. To re-establish the youthful habit, it would become necessary to re-cusp the entire compliment of teeth, which, according to our best authorities, no feasible plan has yet been discovered. So, if the patient has acquired an easy, sliding occlusal plane, by reason of the excessive occlusal wear, the operator can do no better than to restore that condition found, at that time, in that particular mouth. Where operations have previously been made in mouths where the natural forms are still present and these operations fail to restore the natural forms, the faulty operations should be removed at once and anatomical restorations be made.

We find a marked difference in the occlusal form of the teeth of the two arches. The upper teeth show a strong tendency to elongated, pointed cusps, while the lower evidence a tendency to shorter, broader cusps.

Beginning at the cuspid teeth and counting backward, we find in the average normal upper arch thirty-two to thirty-four primary cusps, while on the corresponding teeth below we find thirty-eight to forty primary cusps. We find also a greater number of smaller, secondary cusps and tubercles on the lower teeth. We find also a greater area of masticatory surface on the lower teeth. We are assisted in realizing nature's object for placing cusps, more in number and flatter in form, on the lower teeth, when we take into consideration the mobility of the mandible. The long, sharp, saw-buck like cusps of the upper teeth, holding the bolus, while the moving, more-numerous-cusped teeth of the lower jaw grind it much like the board is held in the saw-buck, and the moving saw is drawn across it; or, as a piece of iron is held in a vice while the movable file is drawn across it.

Beginning at a line drawn around a multicuspid tooth at the region of its greatest circumference, passing over those surfaces forming the contact points, we observe a marked tendency to constriction as we pass toward the occlusal. This constriction increases and finally terminates in points or cusps. This constriction is so strong that we find, in the multicuspid teeth, the distance from the points of cusp to cusp is less, in many cases, than one-half the diameter of the teeth thru the region of the contact points. Failure to observe this tooth form characteristic has led to many errors in attempting to restore occlusal form and function. Operators generally seeming to have the idea that the occlusal surfaces are wide and broad and giving to the restorations entirely too much saucer-like form.

Close study of the natural forms reveals the fact that there is a typical human cusp. The surfaces of this cusp we call its incline planes. The typical cusp possesses on its lingual, buccal and labial surfaces, rounded, almost smooth, ovoid incline planes or surfaces. While the incline plane on its occlusal surface proper, is very different. In the center of this occlusal incline plane, we find raised sharply from its surface, a prominent ridge. Doctor Black denominates this a triangular ridge. It begins at the sulcus and continues to the point of the cusp. Lying on each side of this central ridge we find two well defined depressions, beginning at the sulcus, running laterally to the ridge semi-circularly and converging as they pass toward the apex but fading away just before they reach it. All cusps possess this typical form, or, some modification of it.

No better form could possibly be imagined, for the mastication of the food of man, than this typical cusp. With its modified point, possessing on its masticatory, or biting surface, a central ridge with its two lateral grooves, it forms a happy compromise between the sharp point of the carnivorous and the flat surface of the herbivorous.

We find midway between the incisor teeth and the multicuspid, the cuspid teeth. They, by reason of their different form and position in the arch, perform a special function. Their long powerful crowns terminating in a pointed cusp, anchored by powerful long roots and situated at the angle or corner of the arch, serve to absorb shock, much as the corner of a traveling trunk requires reinforcement to withstand its many blows, and shocks. Their long V shape cusps serve to absorb the first impact of occlusion and guide the teeth into their intercusping relationship. Evidence of this function is manifested by the excessive wear beginning to appear on this tooth early in life.

The term canine is still retained by some teachers and the fact is to be deplored. They are so unlike in both form and function as never to be associated with the round curved fang of the dog. Were we to gather our facts from phylogenetical evolution, we find strong resemblance in the cuspid teeth of some of the lower primates, however, in the canine we find no logical reason for such an appellation.

There is no part of our bodies, be it ever so small, that is functionless. Because we are unable to discern a function does not destroy the fact that there is one. The writers on dental anatomy in the past have devoted much of their study to relative sizes, some less to typical forms and practically nothing to function. All the cusps, grooves, contours, pits, ridges and tubercles, have, in the normal forms, a special function. Gray, in his descriptions of the bone surfaces told us why a certain bone surface was roughened—that it was to provide a surface for the attachment of a certain muscle, etc. So on the human teeth, each cusp, each pit, each fossa, each

contour has a special function and the great intelligence that designed it, did nothing needlessly or left nothing, that would be of value, undone.

Let us consider for a moment some of the valuable functions of the gingival constriction. Why did nature make the tooth largest thru the region of the contact points, and gradually constricting it to the gingival line? Because lying around the necks of the teeth are the delicate soft gingival tissue. When the little fibers attaching these gingival tissues to tooth roots, are broken, they are never re-attached. When the peridental membrane becomes injured, and later thereby diseased, it baffles the ingenuity and wisdom of the wisest men the world has produced to even arrest the ravages of the disease, and to restore the tissues lost, is, at the present time, beyond human possibilities. In view of this fact do we wonder that nature provided a protection for this tissue in the design of the tooth form? How the tender, delicate, attenuated tissue rises up along side of the tooth and the mother tooth, as it were, throws out a contour of belly to protect it. We might compare it to the mother hen when she covers her brood with her outstretched wings.

How kind of mother nature to protect the gingival tissues to such a marked degree, in her strong, sharp gingival constriction on the decidious teeth. In view of the extremely delicate tissues of the child and further, of its immature judgment in the use of its teeth, should warrant the conclusion that nature did not place that extreme constriction there by chance, but with full consideration of the well-being of the child.

As we study the permanent teeth in their protective form, to the gingival and septal tissues, it becomes apparent why she placed the predominating contour on the distal surfaces. The inclination of the tooth crown toward the median line would naturally give protection to the septal tissues on its mesial side. It is evident the distal side would require the greater contour, reaching backward, as it were, to touch the more flattened mesial surface of its neighbor, and giving an arch of enamel for the protection of the very, very valuable septal tissue, which when injured and lost means the early loss of the affected teeth. This same law holds good with regard to the buccal, lingual and labial surfaces.

Much time and space has been given to the discussion of the contact point. How simple it all becomes when we view it from a dental anatomical viewpoint. How easy it is for us to make an anatomical contact point when we learn its object in nature's design and learn to restore the proximate tooth forms. What, after all, is a normal contact point? Simply that point where two teeth normally formed and normally posed touch each other. On each of the teeth we find contact with their neighbors provided for by a special proximate form. This is true of all the teeth but is most typical and beautiful in the bicuspids, where function and use are greatest. Let us consider the upper first bicuspid. It is the most used, most abused, least understood and most beautiful tooth in the human mouth. On each of its proximate surfaces we find a little tubercle which, may I say, anatomists and our best operators, have failed to observe. Without these, this tooth will not functionate. Viewed from the occlusal, these little tubercles very closely resemble a pair of ears. With this little ear this tooth forms, with the distal surface of the cuspid, the most beautiful contact relationship in the entire human mouth.

It is impossible to restore normal contact, form and function without a clear conception of the position and value of these tubercles or ears. These are uniformly present in the second bicuspid also, tho many times to a less prominent degree. They provide most beautiful and efficient contact form for these prox-

imate surfaces. Just lingually to these ears, we find the marginal ridges broken by a well defined groove, which provides for the escape of the excursions into the wide lingual embrasures. Not only do we find the mesial and distal marginal ridges broken by this groove in the upper bicuspids, but we find it also, tho in a less degree, in the other multicuspid teeth, teaching us nature's purpose to provide an avenue of escape for the excursions into the wide lingual embrasures. This preserves continuity of tooth structure and form, cleansing these proximate surfaces, and exercising the septal tissues. On the occlusal the crest of the ear forms the marginal ridge. From this ridge the surfaces converge on a concave line to form a groove which runs toward the central axis of the tooth and terminates in the mesial and distal pits. Care must be taken to place these ears, or tubercles, well to the buccal. Study of the upper cuspid will assist in securing this form. The buccal surfaces of the upper bicuspids very closely resemble the labial surfaces of the upper cuspids. Indeed the upper bicuspids are cuspids with the lingual tubercle developed into a large pointed lingual cusp.

We find nature provides for a normal, physiological contact on all teeth in placing sharply convex points on the proximate surfaces. These are uniformly found most pronounced on the distal surfaces.

While on point of proximate form, to provide for contact, I wish to call your attention to the disto-buccal cusp of the lower first molar. This cusp provides contact form in a very excellent degree. It swings well around into the buccal embrasure. It is illustrated by dental anatomists, entirely too far to the buccal. Close study reveals nature designed it should form the contact, and that it should be brought around into the embrasure practically two-sevenths of the bucco-lingual diameter of the crown. The proximate surface of the lower first bicuspid is provided, almost constantly, with a strong mesial groove breaking the marginal ridge, and providing a condition very similar to the corresponding tooth in the upper arch. While a physiological contact is vitally important, a plus-contact is contra-indicated. The constant force applied will soon cause these sharply convex surfaces to slide past each other and irregularity result. Especially is this true of the front teeth.

Let us turn our thoughts again to the occlusal surface. This surface, we understand, was designed to incise, crush, and together perform the function of mastication. While the bolus must pass onto this surface it becomes a physical impossibility for it to long remain there. By the force produced in meeting the antagonizing teeth, the bolus must make its escape and be, in a very large measure, driven off. Nature has provided for this most cunningly. Off of each surface we find little channels, in the form of grooves, leading off to the cheek where it may, by the buccal muscles, be returned onto the occlusal surface. Likewise, grooves lead to the lingual where the tongue may perform the same function. We find also, grooves breaking the marginal ridges, and passing into the embrasures. Thru these the excursions escape and cleanse these proximate surfaces, preserving the continuity of tooth structure and form, and exercising the septal tissues, altho not coming directly in contact with the attenuated end of these tissues. An error has been made, in the past, by failing to restore the normal occlusal forms and thereby destroying these natural channels. By the powerful force brought upon the teeth in chewing food, which, as we know, runs as high as 350 pounds, much damage is wrought to the cusps by this force driving these excursions over the cusp points and ridges, instead of it passing thru the natural channels. For instance, a fossa is filled with some filling material,

thus preventing the passing of the occluding cusp into it, the result is, the occluding cusp begins at once to be worn away and soon abnormal conditions are produced on both the occluding teeth. In other words, the point of the occluding cusp acts as a divider, dividing the bolus into excursions and starting them thru their physiological channels of escape. If the natural channels for the escape of the excursions are destroyed, by the imperfect restorations, it becomes evident other avenues of escape will be taken by the misdirected excursions. If we make careful study in the mouths of our patients it will be seen, on those teeth where the patient has had, for some time, a flat, smooth filling, the cusp points will show a decided wear and, in many cases, be worn entirely flat and flush with the filling material. There will, in many cases, be a very perceptible wear on the cusps and ridges of the occluding tooth or teeth. This explains why the cusps are so soon destroyed on those teeth where the operations do not restore the natural forms.

Another error has arisen in the idea that the mesial and distal marginal ridges of the bicuspids and molars should be so formed as to deflect the excursions from the interproximate spaces. This adds strongly to the destructive effects of improper occlusal restoration, in that it closes one of the avenues provided by nature for the escape of the food from off the occlusal surface. Further than this, it enlarges the field of liability on the proximate surfaces by robbing them of the cleansing effect of the excursions passing over them.

Much damage to the gingival tissue at the linguo-gingival of the cuspid and incisor teeth has resulted by failure to restore the normal lingual surfaces of these teeth in artificial restorations. It is not altogther necessary that a large tubercle be raised at this point, but that an anatomical, concave form be reproduced.

It will be remembered by those among us who were fortunate enough to grow up on the farm, how the soil would slide over the polished mold-board of the plow, and, after it had left the mold-board, keep on going in the same curved line. Likewise the tooth is forced into the food and the excursions following the concave line of the lingual surfaces, pass over the gingival tissues, leaving them unharmed. The marginal ridges are also a valuable characteristic in the function of these tooth surfaces. It must be remembered they are equally important here as on the back teeth.

It is a law of nature that use of an organ or a tissue tends to preserve it. While either over-use or under-use will tend to rapidly destroy it. So let us not pass to the extreme in the protection of the gingival tissues, by forming an abnormal belly or contour in an effort to protect these tissues. If we have no protection, the tissues will soon be destroyed by overwork and injury. If, on the other hand, we have such a belly that will not allow the excursions to touch or come in contact with these tissues, in the least, we will defeat the object, and the tissues will be lost from non-use. This we have noticed on teeth that have unusually prominent bell-shape crowns. It is the opinion of your essayist that many diseases of the investing tissue can be accounted for by lack of use and exercise to the gingival tissues.

We have made no attempt, in this essay, to outline methods to reproduce these valuable tooth forms, nor have we discussed the relative value of the various materials at our command. But rather, it is my purpose at this time, to draw more closely to your attention some of the valuable characteristics of human tooth forms. We have confined our thoughts entirely to that portion of the teeth above the gingival, saying nothing of their roots. Many other important characteristics are passed, unmentioned, because of necessary brevity of this essay.

Indeed, should we be ever mindful that the restoration of the human teeth is not one of esthetics, but more especially one of function. When we have considered function, and faithfully restored these forms, we have, in a very large degree, reproduced esthetic, tho, perhaps in a lesser degree, cosmetic conditions. So valuable is tooth function—so destructive to health when diseased conditions are present, that we should not, for cosmetic reasons, sacrifice tooth function and thereby invite disease to the oral cavity and to the general health.

The reproduction of human tooth form is the work of a sculptor. Only more difficult because of the difficulties under which we are compelled to work. Our ever present duty is to reproduce exactly, in form, those organs the patient lost. Were a sculptor to take measurements of a number thousand heads, noses, ears and mouths and strike an average, and carve a head and face from these averages, do you think the product would resemble you—more than it would me? How useless then to attempt to reproduce a tooth from form ideas we learned from some teacher in our college days. Or, worse yet, perhaps, form it after something a die plate maker chose to use. If we are building, we will say, an upper first molar, either in whole or in part, if the tooth is in situ, and in good condition, on the other side, it is our model. Ninety-nine times out of a hundred it will be a perfect model, possessing only those differences of left and right teeth. After our operation is completed, our test must be, to take an accurate impression of the row of teeth, and make a model of plaster of Paris, and we should be unable to detect the filling or the crown in our plaster model.

It is evident from nature's design, teeth were formed to be first, useful, second, beautiful. The more closely we imitate nature, the more beautiful they become. There are no flat surfaces on normal teeth. Their graceful, ever-bending lines, join hand in hand, function and beauty.

We look into our patients' mouths and we are filled with admiration at the natural, beautiful things we see there. In comparison we are mortified at some attempts at restoration. How long must this continue? How long shall it be that we are charmed with artistic beauty in the works of our hands in other fields, but when our attention is drawn to the artificial restorations in our mouths, we are sickened by the grotesque and loathsome forms. Oh, human mouth! Thou benefactor and thou destroyer. The Grand Canyon, with its grandeur and its chaotic wonder, does not hold the charm that lies hidden between thy ruby folds. What artisan dare pass thy threshold with intent to beautify thy fairy lands, or build more monumental towers of wisdom?

Discussions.

Dr. John V. Conzett, Dubuque, Iowa.

I think we are very much to be congratulated in having this paper presented by an authority upon the subject. I know of no better authority in this country today, on the subject of tooth form, than Doctor Prime. He has made a study of it, and it would seem to be almost a work of supererogation for me to attempt to discuss the paper, because Doctor Prime has splendidly discussed his own paper as he read it, so I shall simply emphasize one or two of the points.

It is well for us to have such an exposition occasionally, because anatomy and physiology are the foundation stones of medical science, and anatomy and physiology of the tooth, which is simply the form and function of the tooth, should be and is the foundation of dental science. We cannot restore function, we cannot restore form, unless we know something of anatomy, something of the physiology of the tooth, and Doctor Prime has emphasized that fact this aft-

ernoon. It is necessary for us to know form, and Doctor Black some years ago gave us that in Black's Dental Anatomy. That, gentlemen, should be our Bible, it should be beside our operating desk all the time, it should be beside our bench in the laboratory, it should be the book of lore of the orthodontist, because it does not make any difference whether you are a laboratory worker or an orthodontist, if you fail to understand tooth form, if you fail to get under your skin the value of tooth form in your restoration work, you will not secure esthetic harmony between the face and the teeth. If you are going to be able to restore form in a bridge, you must study not only the general form of the incisors, molars or cuspids, but you must understand the individual forms, because we will find that these differ in different mouths. We must study the individual conditions, not the general conditions of the human family, as one of our great operative dentists has said, but the individual teeth, and the individual tooth upon which you are operating and its relation to the other teeth.

Another thing I want to mention is the carving of abraded teeth. I do not believe that the doctor meant that teeth coming to us perfectly flat should be built with the surface perfectly flat. We should restore function as much as possible, and a flat tooth is not a functioning tooth, because it does not grip the bolus, or does it give us a triturating effect. Frequently teeth are worn off until they are perfectly flat, and it should be the part of operative dentistry to restore a surface that will grasp the bolus or give more of a triturating effect, so the food will not slide over this flat surface, altho this attempt at restoration should not be carried to such an extent that it will interfere with the masticatory movements of the mandible—just enough that the tooth may be able to functionate. If you have a flat surface you will find the bolus will have a tendency, because of the rolling movement, to crowd in between the teeth, to the destruction of the septal tissue. So I think the doctor will bear me out when I say that this restoration should be made, but not to the extent that it will interfere with the masticatory movement of the mandible.

The doctor spoke of the removal of faulty fillings. Many a filling I remove that is giving perfect service so far as arrest of decay is concerned; but when the contour has not been properly restored and the septal tissue is being destroyed, when the food can crowd in between the teeth, I have no hesitation in removing a filling and making one that will protect the septal tissue.

The doctor has very beautifully spoken of the channels or bridges which guide the bolus in the proper way—not into the interproximal spaces. The food should not go into the interproximal spaces, but into the embrasures. Food should never be allowed to go into the interproximal spaces, because of the irritation of the septal tissue. That irritation will cause inflammation, and that may proceed to infection, and you will have pyorrhea. Many times teeth have been lost simply by failure to properly restore anatomical form, thus allowing the food to crowd in.

Several years ago a cashier in one of our banks came to me with a tooth so loose that I could, and did, pick it out with my fingers. The history was this: He went to one of our dentists to have a filling put in the proximal surface, and in a short time he went back and said: "There is something wrong with this filling, because the food crowds in there." The dentist took a flat separating file and run it in and said it would be all right, but it was not, and the patient came back saying it was worse than ever. He went back several times, and all the dentist would do was to run this separating file between the teeth, and finally the man gave it up and went on with the tooth in that condition for several years until finally when he came to me the tooth was absolutely lost—simply

because the food had crowded in there to such an extent that it had caused pyorrhea. There was no pyorrhea in any other part of the mouth. The loss of this tooth was caused by the failure of the dentist to understand tooth form. So the important thing in operative dentistry is to understand tooth form and then properly restore that form. The restoration of occlusal form is very important. Many a tooth has been lost because the restoration was made as they have been in the past—simply a flat filling and the food slides over these incline planes into the interproximal space.

Just a little while ago I had a class at Springfield, Ill., and a man came to me and said he wanted me to look at one of his teeth that had been filled, that it seemed all right, except that when he ate any fibrous food it would crowd in and cause discomfort. I made an examination and found the contact point was tight, but the filling had been made flat, so that as he ground his food it was forced toward the proximal surface and into the interproximal space, causing intense irritation of the septal tissue. I took a bur and carved a groove on either side of the contact point so that food would go away from the contact point down thru the embrasures into safety. When the man came back in the afternoon he said he had eaten a chicken dinner and the food had not crowded in. I saw him again at the Illinois State meeting and he said he had had no trouble since.

I want to say this, that the very best way to study tooth form is to make these teeth yourself. That is about the only way you can study tooth form. I have been hunting for a proper substance in which to carve these teeth, and have found it in talc. I have had some difficulty in getting it, but have had some imported from Italy. You can carve these teeth in talc and in that way study each tooth that comes to you. There is a slight differentiation in every mouth, but when you take the impression in talc you will find you can carve them beautifully and very quickly.

Dr. I. H. Harrington, Louisville, Ky.

I do not know that I can add anything to what has been said. In fact, I have not paid very great attention to the paper, because I did not have an opportunity to read it—not because of any fault of the doctor, but it was lost in the mail.

I have not anything special to add, but it has been in a measure an encouragement to me to hear this paper on tooth form, for the reason that when we consider other subjects that are so prominent in the dental line today we got "cold feet," as the doctor said this morning; we get discouraged when we think of the impossibility of properly performing all the operations in the filling of root canals, and all that, and we feel like throwing up the sponge and quitting. But when we hear a paper like this on the reproduction of proper tooth forms, something that we all may do, something that we can see the results of, it is indeed encouraging. I think a study of this subject will repay us.

There was one little suggestion that occurred to me in the reading of the paper, and that is that I do not believe in carrying out the design of the tooth forms found in the mouth always, as seemed to be suggested by the paper. I think we may often improve on the forms found in the mouth. For instance, where gum recession has taken place and you find inter-dental spaces, while you may have contact you will have these V-shaped spaces, and I think if we will restore that form without those spaces we will help our patients—not leave those V-shaped spaces, but rather produce a belly as you would if the tooth had not been worn off on the occlusal surface. Restore the form of the interproximal spaces to what it would be if the gum tissue had not receded. I want to offer this as a suggestion.

DR. M. E. VANCE, Lincoln, Neb.:

I would like to say a word as relating to this subject of contour. Many restorations which we have made in years gone by are the direct cause of the loss of the teeth from lack of proper contour. Dr. Prime, as Dr. Conzett has said, is probably the greatest authority in the country today on tooth form. He has made a more thoro study of it than most of us have been able to do. His ability to construct and reproduce the natural tooth form is greater than the ability of most of us, yet as Dr. Johnson used to say in his lectures at the Chicago Dental College, we should have before us an ideal from which to build, an ideal filling in resistance and in form. Dr. Prime has outlined to us this afternoon an ideal in this work, and if we can in an approximate way follow out the suggestions that he has made and the thoughts he has given us, it will enable us to do better service for our patients. If you will notice, many of the restorations that you see in mouths, both gold and amalgam, are flat surfaces. Such conditions can be relieved and benefited by the method that Dr. Conzett spoke of, avoiding the excursion of the food into the interproximal spaces, causing not only constant irritation of the peridental membrane and septal tissue, but loss of the tooth—as in the case that came under Dr. Conzett's care.

DR. JAMES MARK PRIME (closing):

Mr. Chairman: In closing I wish to thank those who spoke in complimentary terms. In Doctor Conzett's remarks where he refers to the flat occlusal surfaces, I wish to say I see no reason why we should depart far from imitating, in our restorations, the forms we find in that mouth at that particular time. If we restore sharp cusps we must remember the sharp points will meet a flattened surface in the antagonizing teeth and will, so to speak, punch holes in the food rather than masticate it. A very slight deviation from the extremely flattened surface may be permissible but it must be moderate. In those cases where fillings are found in mouths that do not restore the natural forms, Doctor Conzett says he changes them. I grant they may be improved by changing the occlusal surface but how, I wish to ask, are we going to change the proximate, buccal or lingual as the case may be? It is more important that these surfaces be restored than the occlusal, while we grant the occlusal is important indeed. While these surfaces have their parts to play (with the occlusal) in the masticatory function, they have a more important one in forming the contact relationship with their neighbors and the protection of the underlying investing tissues.

The Doctor further spoke of the food passing into the interproximal space. This is a cunning plan of nature in the formation of the marginal ridges with relation to the contact. Immediately over the contact we find provision in the form to deflect food from the interproximate space, but immediately on each side we find the form invites food excursions into the embrasures.

Dr. Harrington suggested that we change conditions to the ideal. As a result of the disease of the dental organs and their environing tissues we find many abnormal conditions such as loss of teeth, malposed teeth, etc. In some instances we may inject our own personal idea and make improvement but as a general statement when we attempt to change or improve upon nature we are treading upon dangerous ground. We must not be unmindful of the fact where we build out an abnormal proximate surface to close a space and make contact with another tooth we will save the underlying tissues from injury in some cases, that is true, but we create a yeast pocket which is an ideal field for the growth of bacterial life and unless we keep it constantly flushed the sequella may be even worse than had we left the space.

THERAPEUTIC TREATMENT OF PULP DISEASES.

By Thomas P. Hinman, D. D. S., Atlanta, Ga.

(Read before the National Dental Association at its Twentieth Annual Session, Louisville, Ky., July 25-28, 1916.)

THE therapeutic treatment of pulp diseases when the vitality of the pulp cannot be retained, including the aseptic management of root canal treatment, having special reference to sterile conditions of outside of tooth, hands of the operator, rubber dam and holder, broaches and cotton employed in the application of remedies is what I wish to call to your particular attention. This will not include the opening up or gaining access to constricted canals. The many secondary infections that have arisen thru the formation of peri-apical abscesses on the roots of teeth which have been filled in times past where aseptic precautions were not followed, are such as to require that some standard method of aseptic procedure must be instituted and followed by our profession in the handling of these cases.

The methods heretofore in vogue where, in the field of operation, the hands of the operator and the instruments employed in the treatment have not received proper sterilization must be abandoned, as this lack of aseptic has unquestionably caused the infection of a large number of root canals. The procedure which should be routine in every office is as follows:

In cases where the condition of the pulp is such that removal is deemed necessary, the teeth should be first thoroly cleansed by polishing and the rubber dam applied, which should include only the adjoining tooth. The decay should be removed from the cavity and as much of the tooth structure as is necessary to gain access cut away. All work with burs and excavators should be finished and the chair and the patient's head should be arranged in the best position for the operation before the hands are made sterile. When this is done, the hands should be thoroly scoured, using green soap, then sterilized by dipping in cyanide of mercury, 1 to 1000, followed by fifty per cent alcohol, as will be shown in the moving picture. If properly done, this will render the hands aseptic.

After this, the rubber dam is sterilized by the following method:—the teeth, clamp and dam are wiped off with seventy per cent alcohol which is dried off and application made fifty per cent iodine. Iodine discolors, therefore, after it has stayed on at least five minutes, it may be wiped off with ninety per cent alcohol. This procedure will render the area to be operated on, as well as the rubber dam, sterile. There should be a complete set of instruments, including excavators, broaches, drills, reamers and files which have been properly sterilized kept in a sterilized tray. This procedure is indicated in all cases.

There are two distinct methods of pulp removal, each being indicated according to the diseased conditions of the pulp: first, pulps not infected, conductive, infiltration or pressure anesthesia; second, where pulp is infected, the

use of powerful escharotics, conductive or infiltration, but not pressure anesthesia. In some instances, a combination of these two methods may be followed, that is, the sealing in with cement of desensitizing paste where the pulp is infected. This will completely desensitize the coronal portion of the pulp as well as partially sterilize it. This coronal portion may be removed painlessly and pressure anesthesia with novocain suprarenin or cocaine adrenolin instituted. This procedure should be accomplished under sterile conditions and may be done by following the method of application of rubber dam, sterilizing of hands, instruments and cotton as heretofore explained.

After the removal of the pulp, in all conditions the discharge of blood and serum should be into an antiseptic field. This is accomplished by sealing into the pulp chamber a pluglet of cotton, saturated with fifty per cent iodine, or preferably a pluglet of cotton dipped into alcohol and then into iodoform sealed in with cement. This is good surgery.

The absorbent points used in drying the canals are kept sterile by being placed in a small container, one-half filled with thymol crystal. Guttapercha points are kept immersed in seventy per cent alcohol. In cases where there is a pulp abscess present, this should be opened and drained and its removal accomplished under conductive or infiltration anesthesia. Before the rubber dam is applied, all of the decay and the coronal portion of the pulp containing the abscess should be removed with burs and the cavity thoroly syringed out with five per cent salt solution. The rubber dam should then be applied and a pluglet of cotton saturated with fifty per cent iodine placed in the pulp chamber and allowed to remain at least five minutes; wash out with seventy per cent alcohol and proceed to remove the pulp. Under the foregoing conditions, pressure anesthesia is contra-indicated.

If the hands, the dam and all of the instruments have been properly sterilized, no danger of infection will follow. If considerable bleeding follows the extirpation of the pulp, this may be controlled by wiping out the canals with sterile, absorbent points. No attempt with styptics should be made to stop the bleeding, because if a medicamen or even cotton, is forced into the canals, the teeth will become sore on account of the effusion of blood beyond the apex.

Seven days after the removal of the pulp, the coagulated blood in the canals is washed out by the use of hydrogen-peroxide, one ounce, and bichloride of mercury 1-1000 on an ounce, pumping it into the canals with a sterile broach. The canals are then treated with the potassium sodium compounds, or the sulphuric acid bi-carbonate of soda combination, then dried and ready for filling. The reason why seven days should be allowed to transpire between the removal of the pulp and filling the canal is to allow the peri-apical tissues to heal so that when the canals are washed out there will be no danger of starting a fresh flow of blood.

The use of essential oils in the canals, or any form of treatment for the purpose of sterilization is contra-indicated. The preceding formula accomplishes everything to be desired without the evil effects of the former method of mediation.

In the treatment of septic canals, sterilization is accomplished first by washing out the canals with the hydrogen-peroxide bi-chloride of mercury solution This is followed by the use of Schrier's paste or the potassium sodium compound manufactured for this purpose. It has been found that if the canals are thoroly cleansed with this material that sterilization is nearly complete in every case, the residue from this procedure which has remained in the canals, caused by the action of the potassium sodium on

any organic tissue, is removed by washing out the canals with hydrogen-peroxide bi-chloride solution. All broaches or instruments used in connection with this material, of course, should be previously sterilized; thirty per cent sulphuric acid may be pumped into the canals and their lumen enlarged by the aid of the well known rat tail files made for this purpose. If this is followed by a saturate solution of sodium-bi-carbonate, the canals will be left sterile. This is only true where these medicines are allowed to reach.

I still believe in and follow the practice of putting with the chloro-percha that is used with the putta percha points in filling root canals, one dram of iodoform to one ounce of chloro-percha. While I fully appreciate that there is no permanent antiseptic that we know of which may be introduced into the root canals, still, the iodine in the iodoform which is set free in contact with moisture does serve a good purpose in sterilization.

TREATMENT OF MOIST GANGRENE OF THE PULP.

In treatment of this condition, the rubber dam is applied and the coronal portion of the pulp tissue is removed. Formo-cresol is then sealed in the pulp chamber with cement without creating pressure. In twenty-four hours the rubber dam is again applied, sterilized, the cement is removed and the contents of the canal washed out with the hydrogen-peroxide bi-chloride of mercury solution. Further sterilization in the canals is accomplished either with the sulphuric acid or potassium sodium compound. In dry gangrene of the pulp, the same method is used.

AIMS OF ROCHESTER DENTAL DISPENSARY.

By H. J. Burkhart, D. D. S., Director, Rochester Dental Dispensary.

(Read before the Rochester Medical Association, Wednesday Evening, Oct. 4, 1916.)

IT GIVES me much pleasure to appear before this Society tonight, upon the invitation of your Secretary, for the purpose of briefly considering with you the work contemplated in the Rochester Dental Dispensary.

In a general way I assume you are of the opinion, as is the public generally, that the work will consist of the usual relief and rescue work of the ordinary college or hospital clinic, or infirmary. While at first a considerable portion of the time will be consumed in this sort of work, it is not the purpose to carry it on indefinitely, because that would defeat the main object of the founding of the Dispensary by Mr. Eastman—namely, to demonstrate the value of preventive dentistry. In that lies the hope for the future. Relief and rescue work in dentistry is all very good, and very necessary, but in the large majority of cases it gets us nowhere, for the reason that we perform the operations for the filling of the teeth after they have become fully calcified and in position in the jaws, or we have to remove badly decayed teeth because they are too far gone to save. Neither of these practices is of much value, except perhaps to demonstrate the comparative value of filling materials, or improve the skill of the extractor. We are, therefore, confronted with the problem of how best to accomplish the purpose for which this institution has been organized. There are few precedents to follow. Many theories have been and are being advocated. Everyone has his own peculiar idea and theories, out of which we hope to obtain sufficient knowledge to justify the generosity of the founder of this institution.

DENTAL HYGIENISTS' SCHOOL.

The plan of the Board of Trustees of the dispensary and the director at the present time is, first of all, to organize a Dental Hygienists' School for the education and training of young women to do prophylactic work, so that their services may be available not only to dentists, but to the schools and public institutions. This school will be opened soon. The syllabus and hours of study are now in course of preparation. Lectures and demonstrations will be given by medical and dental men of Rochester and other places. The subjects taught will be anatomy, physiology, bacteriology, histology, hygiene, sanitation, dietetics, etc., together with lectures and talks on office etiquette, deportment, bookkeeping, card indexing, and such other things as will make a young woman a valuable adjunct to an office.

We believe that the training of young women to clean the teeth of the children properly and teach them the value and benefits to be derived from clean mouths, will go a long way toward establishing correct hygienic conditions, and thereby prevent to a very large degree decay of the teeth. These young women will also be a valuable adjunct to the dentist in providing assistants who will do work that has been much neglected because of

the drudgery and length of time required to do it and its lack of remuneration as practiced in the past.

SURVEY OF CHILDREN'S MOUTHS.

The next step will be a survey of the mouths of the children of this city, which will be made by the members of the Rochester Dental Society and the dental hygienists. This work will be valuable because it will show the need for dental service, and also for the purpose of comparison and study.

The records will be kept in triplicate; one card will be sent to the central dispensary for study and filing, another will be kept in the school or institution where the exhibition is made, and the third sent to the parents, with the request that the family dentist or physician render such service as may be necessary; or, where the family is without funds, some arrangement will be made to do the work in the dispensary. The cards on file in the dispensary will be carefully tabulated and a study made of them. Some very interesting statistics will no doubt be obtained, and will determine to some extent our course of procedure.

TO HELP BACKWARD PUPILS.

We shall endeavor in co-operation with the school authorities to make careful and extended examinations of the mouths of defectives and the backward pupils. If only a small percentage are benefited by dental treatment, the work will be well worth the effort. All cases coming to the dispensary for treatment will be thoroly investigated by the social secretary, to make sure that service is not extended to those able to employ a regular practitioner.

It is our intention to employ a competent person to inaugurate and carry on a toothbrush drill in the schools and institutions, so that children may be taught by lectures, object lessons and pictures the proper way of brushing their teeth. If possible some way will be devised to furnish the children with brushes at a very moderate price.

In a general way, a campaign of education will be carried on by those connected with the Dispensary, and especially the hygienists, so that the children and the public will be taught the necessity for clean mouths as a necessary step toward good health.

LECTURES IN INSTITUTIONS.

It is also our purpose from time to time to provide persons who will deliver talks and lectures in the schools and public institutions on all matters relating to the care of the teeth. It is our intention to organize mothers' clubs for the proper feeding of the babies, with the hope that dental and other conditions may be greatly improved.

The necessity for a more liberal education along this line is apparent to all of you. I hope with your assistance and that of the Department of Health, and the school authorities, we may be able to accomplish something of real value, and set a precedent for other cities to follow.

DEPARTMENT FOR OPERATIONS.

There will be a department for operations for cleft palate and hare-lip cases, and we shall endeavor to operate upon the babies as soon after birth as we are able to reach them. This will be done for two reasons: First, because, as you know, better results are obtained by early operations, and, secondly, so that appliances may be made to spread the arches as soon as the first teeth are in position in order to provide ample space for the permanent teeth and thereby not only improve the mouth for the purpose of properly masticating the food, but restore the contour of the face.

Operations will be performed for the removal of tonsils and adenoids, but before these are done all carious cavities will be filled and the mouth placed in a thoroly aseptic condition. This rule will be rigidly adhered to, and every pos-

sible source of infection about the mouth removed, whether it be due to decayed teeth, alveolar abscesses or any other cause, before operations are performed.

An X-ray laboratory will be provided with all the latest appliances and facilities for doing this most important work. A competent operator will be in charge, and every effort will be made to bring this work up to a high standard of efficiency. Here, too, you will have the opportunity of assisting by your advice and labor in developing one of the most important adjuncts to the practice of medicine and dentistry. All of this work except the cleaning of the teeth of the children in the schools and public institutions will be done in the Dispensary. It could not very well be done in any other place, and carry out the purpose for which this institution has been founded.

CENTRAL DISPENSARY.

Objection has been raised in some quarters to the idea of a central Dispensary, but in my opinion the wisdom of its founder and managers will be justified soon after the work is begun. While units may be of value for minor operations, the whole scheme would fall of its own weight by a splitting up of its activities. The mere matter of supervision alone would prove so vexatious, and unsatisfactory, that few would undertake the work, and those who did would be doomed to failure at the very start. Altruism is a very good thing to talk about, but in actual practice there is not as much of it as many of us are led to believe by some of the extravagant statements we hear. Human nature is quite the same in professional men as well as in others, and the experience of those who have supervised work done in units leads me to believe that operators there watch the clock to wait for the whistle to blow about as much as those who are engaged in other pursuits.

In my opinion the sociological side cannot be considered in connection with this work except incidentally. This city is not so large but that any child can come to the Dispensary to avail itself of its benefits, without any great sacrifice of time or injury to its school work. But whether the ideas of the founder and managers are correct or not, makes little difference at this time. The facts are that we shall have a central Dispensary, and it only remains for those who are interested in the work to give it their hearty support. The whole subject of preventive medicine and dentistry is of absorbing interest.

A BETTER EDUCATED DENTIST.

I say to you frankly that dentists must get away from the purely mechanical part of the work if any great advance is made in preventive dentistry. While the value to a large extent of the dentist's work will always depend upon manual dexterity, and the proper application of mechanical skill, there must be coupled with it a more general and liberal education along medical lines.

DENTISTS SHOULD HAVE M. D. DEGREE.

This naturally leads to a discussion of the relations that should exist between medicine and dentistry, and the medical man and dentist. To discuss the subject in detail or at great length is not the purpose of this paper, but I welcome this opportunity of talking to you about it because of the seeming lack of harmony that has existed, and does to some extent prevail now, between physicians and dentists. In my opinion, there is really no good reason why both cannot work together with that singleness of purpose that should animate the true professional man. There are many of us who regret that there should be a separate degree for dentists, and I hope the day is not far distant when all who practice the specialty of dentistry will be required to have the degree of Doctor of Medicine. The medical profession

has itself to blame because dentistry went off by itself. Some eighty years ago the then leading practitioners of dentistry endeavored to have medicine recognize dentistry as a part of the healing art, and sought admission to various medical schools for the purpose of teaching the specialty. Due to the narrowness and shortsightedness of the medical men of that time, charters were obtained from legislatures for the establishment of dental schools, and dentistry was launched as a profession with a degree of its own, when it should have remained as one of the specialties of medicine. From a small beginning dentistry has grown until now there are close to 50,000 practitioners in the United States and Canada, with fifty or more dental colleges. Dentistry has its own organizations, periodicals, literature and scientific books, and is dividing into specialties as has medicine.

MEDICINE AND DENTISTRY MUST CO-OPERATE.

It is unfortunate that medicine and dentistry have been separated, and that we are practicing under different degrees. It is due very largely to an inexcusable lack of co-operation. Dentistry is in need of a more extended knowledge of general medicine, and particularly pathology, and medical men are equally in need of a better knowledge of dental histology and dental pathology. Within a few years the study of mouth infections has not only been a fashionable, but a very important one, and in many cases where no other cause could be plausibly found for the various obscure systemic disorders, the teeth have been made the "goat," with the result that untold harm has been done in their needless and ruthless sacrifice. It seems to me that there should be a gentleman's understanding between medical men and dentists, that before a final decision is rendered in disputed cases, they should be considered in their various phases. Reasonable men, and those who place the good of their patients first, will have little difficulty, by consultation and an interchange of opinions, in arriving at a fairly satisfactory understanding. I know of many cases, and so do you, where a dogged insistence upon having their own way by both physician and dentist has led to a bitterness of feeling for which there was little excuse, and in the end the patient paid the penalty. We have striking examples every day of how easy it is to be mistaken in the reading of radiographs alone. You all know that most anyone can see anything he wants to, or satisfy himself that he sees what he thinks should be there, if he is so disposed. I refer particularly to radiographs of the teeth and jaws. Just now there is a tremendous campaign being waged for the extraction of all dead teeth where the roots are not filled clear to the apex. Much harm is being done by this propaganda because as a matter of fact many of these teeth have been filled for twenty or thirty years without giving the slightest discomfort. There is no inflamed area about them and no indication of infection of any kind. Nature in many cases has thrown its protection around these unfilled roots, which for some reason or other, were not, or could not be filled clear to the apex. While of course it is desirable that all roots be filled to the end, it very frequently is not possible to do so. Teeth are lost because of poor and faulty manipulation in endeavoring to fill all roots to the apex, by reason of the liability of drilling thru the sides of the roots, or forcing the material thru the apical foramen, and so I say before you condemn all dead teeth of the kind of which I speak, consult the dentist's record and you may change your mind. When it comes to considering what should be done with loosened teeth in cases of pyorrhea, it is also well to go slowly, because in a very large percentage of cases the teeth can be made comfortable, and

serve their purpose for a long while. Of course, I do not wish to be understood as advocating the retention of teeth, where the jaws and gums are badly diseased, but the idea I do wish to leave with you is that most pyorrheal conditions may be greatly improved by mechanical means, and afterward by the use of proper remedies. No one should be deluded with the idea that a dose of ipecac or an injection of emetin will cure pyorrhea without mechanical aid and subsequent cleanliness and care of the mouth.

SUCCESS OF DISPENSARY DEPENDS ON TEAM WORK.

This brings me to a subject quite personal to myself, but of far more importance to you medical and dental men of Rochester, and to the public. I refer to the attitude which you will assume toward this institution when completed and the work which is to be done there. While it will be known as a Dental Dispensary, a very considerable part of the work contemplated will require the service of medical men. If we are to prove anything of value in preventive dentistry it must be recognized that tonsil, cleft palate and hare lip work are closely allied with prophylactic and orthodontic work, as well as the treatment and filling of teeth, and the restoration of the mouth to a healthy condition. All these things must be co-ordinated and we must at least assume at the outset that one is dependent upon the other to some degree if we are to establish harmonious relations, and work toward a common goal. This Dispensary is not intended to be an institution for the education of dentists, or to exploit any person's theories. It will be an open forum where all may have an equal chance. While many of you medical men have shown an interest in the proposed work, I am going to ask of you something more than just prefunctory assistance. I am here to invite your cordial co-operation in our various endeavors, and in that I am sure I voice the sentiment of the founder of the institution, the Board of Directors, and the dentists of Rochester. This is no private preserve of my own; I have no ideas or theories which will not be changed or modified, after a mature consideration of anything that may be presented, looking to the accomplishment of our purpose. I am the representative of all of you medical men, dentists, and citizens of Rochester, and my success or failure or that of the Dispensary will be and should be your concern quite as much, or more than my own. I realize very fully the responsibilities of the position and I have had experience enough in other activities so that I am very well aware of the fact that no one can singly, and alone, make a success of an enterprise of the magnitude and importance of this one. It is only by good team work, cordial co-operation, sympathy, and real unselfish devotion that we achieve success anywhere. There are other sides that we professional men should not lose sight of. The eyes of not only the dental but the medical world are upon us, and we must not fail, because the good name of the City is at stake. And, furthermore, if we are to obtain assistance from philanthropists and men of wealth in the future, to carry on experimental work and demonstrate our theories, we must render a service that will satisfy them that their investment is worth while.

ROCHESTER DISPENSARY STANDS FOR BENEFIT OF CHILDREN.

There is a most unusual and unique situation here, in the organization and maintenance of the dispensary. Mr. Eastman makes his most generous contribution without any restrictions as to management, or the particular lines of activity to be followed, except that this institution shall be for the benefit of the children of Rochester. Thirteen prominent business men contribute a thousand dollars a year each for six years, and give much valuable time in addition.

The City of Rochester contributes $20,000 a year for the work in the schools. Surely with this backing and the incentive for performing a great service to the needy poor, not only of Rochester but other cities, because if the work here proves satisfactory other cities will follow, there should be no end of enthusiasm and willingness to make some personal sacrifices to make this institution the most effective agency for good in its special field in the world. I see in this project the opportunity for doing a wonderful work for the children of Rochester and those who come after them. We have before us a wide field for our activities, and the great good and comfort which we can bring to untold numbers should spur us on to our very best efforts. I invite you again, as cordially and sincerely as I know how, to take a personal interest in our work and give us the benefit of your advice and assistance to make the Rochester Dental Dispensary the foremost institution of its kind in the world.

CHAIRMAN'S ADDRESS AT THE JOINT MEETING OF THE NATIONAL DENTAL ASSOCIATION AND THE INTERSTATE ASSOCIATION OF ANESTHETISTS AT LOUISVILLE, KY., JULY 27, 1916.

By Hugh W. MacMillan, D. D. S., Cincinnati, Ohio.

THIS is truly an auspicious occasion and one teeming with great opportunities for the future. This is the first time in history that two first-class organizations representing the medical and dental professions have met on equal terms to discuss vital subjects of common interest. This is the moment which leading thinkers of both professions have eagerly looked forward and in this common meeting their ideals so fondly cherished are consummated.

It is particularly fitting that this reunion occur in the discussion of the subject of anesthesia. No greater gift has been given to humanity than the wonderful endowment of loss of sensibility to pain. It seems hardly possible to younger men in the profession that the first general anesthetic, nitrous oxid, was administered only seventy-two years ago. In the days of our grandfathers, cracked ice, Indian hemp, opium, and alcohol were the agents used to diminish the agony of the suffering. In these days of modern surgical procedures by the aid of trained anesthetists and by the employment of anesthetics best suited to the case, operations can be performed which were not dreamed of seventy-five years ago.

As a coincident to this common meeting it is an interesting fact that dentists and physicians have shared equally in the discovery and early development of anesthesia. In Hartford, Connecticut, a tablet was erected on the wall of the building now occupying the site of the building in which Dr. Horace Well's office was situated. The tablet bears the following inscription:

"ON THIS SPOT HORACE WELLS, DECEMBER 11, 1844, SUBMITTED TO A SURGICAL OPERATION, WHEREBY HE DISCOVERED, DEMONSTRATED AND PROCLAIMED THE INESTIMABLE BENEFITS OF ANESTHESIA."

There is also a monument in Hartford to Wells erected by the State of Connecticut and the City of Hartford. The citizens of Boston erected a marble monument to Morton in Mount Auburn Cemetery with the following inscription:

"WILLIAM THOMAS GREEN MORTON, INVENTOR AND REVEALOR OF ANESTHETIC INHALATION BEFORE WHOM IN ALL TIME SURGERY WAS AGONY, BY WHOM PAIN IN SURGERY WAS AVERTED AND ANNULLED SINCE WHOM SCIENCE HAS CONTROL OF PAIN."

In the present day, members of both professions are equally prominent in the administration and research work connected with this great subject.

Reading from Constitution of the Interstate Association of Anesthetists:

"The objects of this Association shall be to advance the science and practice of anesthesia and analgesia; to promote the teaching thereof and to conserve the interests of anesthetists."

Its members are composed of licensed practitioners of medicine and dentistry interested in anesthesia and analgesia.

It has been asked what advantages would the general practitioners of dentistry derive from being a member of this society?

It becomes the unwritten obligation of every individual entering a profession to

strive to make that profession better for his presence. The watch word of today is service. Men more clearly realize the truth of the old saying,

"What I kept, I lost;
What I spent I had;
What I gave, I have."

One of the objects of this Association is to establish the teaching of anesthesia and analgesia in the curricula of all medical and dental colleges. The great majority of graduates enter the practice of their profession with no thought of advancing the methods or educational requirements of their professional schools. They daily witness shortcomings in the education of future associates without even suggesting better plans or endorsing those men who are working for better conditions. The status of a profession is not in the ideals of that profession but in the general average of its members. One of the greatest pieces of service which the individual dentist can render it to obtain membership in this organization and insist that the education of dental and medical students in anesthesia be improved. Until all professional schools are run for the benefit of humanity and not for private gain, supervision of them is not only necessary but should be considered by each individual as his professional obligation.

Another opportunity for the general practitioner to advance the standards of his profession is to ally himself with a body of men which is striving to guide the legislators in the various states to pass laws which will truly serve the medical and dental professions as well as the general public. One of the most reprehensible propagandas against dental anesthetists occurred only last year in New York State. The bill as it entered the New York legislature was known as "A Bill to Regulate the Administration of General Anesthetics by Persons other than Licensed and Registered Physicians." The following is the bill:

"The administration by any process of any substance, liquid or gas, commonly called a general anesthetic, for the purpose of producing unconsciousness, shall constitute the practice of medicine and surgery, even if undertaken in the presence of and by order of a licensed and registered physician, surgeon or dentist, with the following exceptions:

"Sec. 1. A licensed and registered dentist may administer any general anesthetic for any operation which such a dentist can lawfully perform, but not for any operation which a dentist cannot lawfully perform, even if a licensed physician is present and directs such dentist to administer such general anesthetic, except as hereinafter provided.

"Sec. 2. In any case of sudden severe illness or sickness in which the licensed physician or surgeon in attendance upon the patient conscientiously believes that the delay necessary to obtain the services of another licensed physician to administer a general anesthetic, will endanger the life or health of the patient, that attending physician or surgeon may employ any reliable person to administer such general anesthetic in his presence and directly under his instructions, but not in his absence. The employment in this manner of any person other than a licensed and registered physician to administer any general anesthetic must be strictly limited to emergencies in which the services as anesthetist of a licensed and registed physician cannot be quickly and easily obtained, and must not be a regular or habitual practice.

Nothing contained in this statute shall be construed to prohibit necessary practical instruction in the administration of general anesthetics being given to registered medical students by licensed physicians or to registered dental students by licensed dentists or licensed physicians; always provided that while giving such instruction, the instructor devotes his entire attention to teaching and neither operates or does any medical surgical or dental work unconnected with

the administration of a general anesthetic."

Commenting on this bill the editor of the Anesthesia Supplement of the American Journal of Surgery writes: "The Editor of the Supplement submits that this statute if passed as printed will not accomplish its purpose, but will involve dental and surgical anesthetists in a maze of difficulties. It is an entirely misguided and reprehensible propaganda.

"While the SUPPLEMENT is making every effort to abolish the evils involved in the administration of anesthetics by non-medical anesthetists, it cannot subscribe to the limitations this statute intends to place on the dental anesthetist, and it is hoped that dental associations in New York will give this matter their immediate attention.

"This effort to differentiate the respective prerogatives of dental and surgical anesthetists is responsible and in direct contravention to the spirit of amalgamating the interests of both professions, which is leavening the American professions of medicine and dentistry.

"Section 2 of this statute simply leaves a loophole for future violations of the law; while the final paragraph shows how absurd a propaganda of reform may become under the lash of misguided enthusiasm. This section if strictly interpreted and enforced would utterly abolish dental anesthesia clinics as they have been held for years in connection with state and national dental association meetings.

"Moreover, it would imperil the future of analgesia, as a technic of pain-alleviation, in which the surgeon or dentist both administers the anesthetic and operates, and teaches."

Thru its official Journal the Association prints the papers presented at its various meetings and is enabled to carry out its policies for the advancement of anesthesia. This association was able to halt the legislation on this bill and to secure the substitution of another bill which placed the medical and dental anesthetist on equal footing.

One of the greatest advantages of this common meeting to the individual dentist is that it gives him an opportunity to learn improved methods and to obtain latest information on the subject of anesthesia. The average medical or dental student is not prepared to pass a fair examination from the knowledge of anesthesia which he acquires during his college course. The medical student's knowledge is obtained by giving anesthetics in his interneship. The dental student memorizes sufficient answers to pass the state board. That this information necessary to administer scientifically an anesthetic can be obtained is evidenced by physicians and dentists of international reputation present here today who have educated themselves in this science. One of the greatest evidences of advancement in dentistry is the change of attitude regarding reading and studying. Laws which were supposed to be fundamental have changed until it is necessary to really study to keep within reach of these present day investigations. In this program of today methods never before written, illustrations never before shown in any textbook will be presented to you by the speakers who are to follow.

The present high standards demanded by physicians and dentists demand the most efficient organization and co-operation to culminate its purpose. We must remember that each one of our professions is but a part of the vast mosaic of biology. We must sacrifice personal feelings and professional prejudices to the great cause of advancement in the science of life. Only by the aid of each individual can these things be accomplished and may each be sufficiently recompensed by the privilege of doing his part.

THE RESEARCH DEPARTMENT.

CONDUCTED BY

The Research Institute of the National Dental Association

All Communications for this Department Should be Addressed to the President and (Acting) Managing Director, Weston A. Price, M. S., D. D. S., Research Institute of the National Dental Association, Cleveland, Ohio.

DENTAL CARIES.

By Russell W. Bunting, D. D. Sc., and Florence H. Wixon, A. B.

(Being the work done on this subject in the laboratories of the University of Michigan under the auspices of the National Dental Association during the year 1915-1916.)

As a continuation of our investigation of the causes of dental caries, which we have previously reported in the columns of The Journal of the National Dental Association,* we have this year confined our attention largely to three special phases of the subject, as follows: the calcium content of the saliva; the acidity and alkalinity of the saliva; and the character of the external enamel surfaces. The data which we present at this time, constitute a tentative report of the work which we have done during the past year upon this problem. Much more work is still to be done before the significance of the factors discussed shall be apparent to us.

In this work we have come more and more to recognize the difficulties which enter into the correlation of certain physical or biological states with the immunity or susceptibility of the individual to dental caries. It is very evident that such susceptibility and immunity varies at various ages, and is the result of general physical conditions. The significance of such variations is, at the present time, entirely hidden from us, for no one can determine, either by chemical test, or clinical observation, at just what time or times the teeth of any individual have changed from immunity to susceptibility, or conversely, from the state of susceptibility to immunity.

In the study of the saliva in its relation to caries-susceptibility, one may easily be misled into judging a carious mouth susceptible, when in reality it may have changed to the immune state, in which, if the cavities were all properly

* Vol. I, No. 4, and Vol. II, No. 3.

filled, there would be no further recurrence for many years. Plainly, such a case would have the biological characteristics of an immune mouth, while the clinical appearance would be that of a susceptible one. Conversely, we may examine a case in which no caries is present, having every appearance of immunity, and yet at that very time, bodily conditions may have so changed, that the mouth in reality, is in a state of susceptibility, which will be evidenced by the future occurrence of caries. So that in the accumulation of our data, the possibility of error in judging the class to which the various cases belong, has been kept clearly in mind, and deductions have been drawn from only those which evidently belong to the class of distinct immunity, or that of susceptibility.

CALCIUM CONTENT OF THE SALIVA.

We have continued our investigation of the calcium content of the saliva of many distinctly carious immunes and susceptibles, with the view of adding to the data which we presented in a previous report.*

The results of the calcium determinations made this year, were not quite as high as during the last, which may be due in part, to the fact that they were made by different technicians, but the same general relationship between the amount of calcium and the susceptibility to caries is seen to exist. Of the cases which seemed to be distinctly immune, the following amounts of calcium were found in each 25 ccm of saliva, stated in terms of CaO.

.0027 gm	.0030 gm	.0034 gm	.0032 gm
.0028 gm	.0028 gm	.0025 gm	.0032 gm
.0035 gm	.0025 gm	.0030 gm	.0033 gm
.0032 gm	.0026 gm	.0031 gm	.0030 gm
		.0025 gm	.0027 gm

Calcium (CaO) content of 25 ccm of salivas of immune individuals.

In those cases which were evidently susceptible, the following amounts of CaO were estimated in each 25 ccm of saliva.

.0021 gm	.0017 gm	.0017 gm
.0021 gm	.0018 gm	.0019 gm
.0019 gm	.0028 gm	.0015 gm
.0019 gm	.0022 gm	.0018 gm

Calcium (CaO) content of 25 ccm of salivas of susceptible individuals.

In addition to these, many other salivas were examined, but we were not able to determine from the clinical data obtained, to which class they properly belonged, and we therefore discarded them.

A number of cases of pregnant women in the maternity ward of the University Hospital were followed for several months. In each case the calcium content was found to be below the average, and remained so thruout the period of confinement. Many of these cases were suffering severely from rapid caries.

Case G.	.0021 gm	Case Lg	.0018 gm
Case Hn.	.0018 gm	Case Ls	.0017 gm
Case He.	.0015 gm	Case W	.0017 gm
Case K.	.0017 gm		

Calcium (CaO) content of 25 ccm of salivas of pregnant women.

As regards the importance of calcium in the saliva as a determining factor of dental caries, we can draw no definite conclusions. We may safely say, however, that of all the factors which we have investigated, the amount of calcium in the saliva, bears the most direct relation to the condition of the teeth, and their susceptibility to caries. Whether the calcium content of the saliva is in itself a determining factor in the process, or whether it is but a coincidence, we are unable to say, but to those who have watched it over a large number of cases, checking the calcium content with the condition of the teeth, it has seemed to be of sufficient importance to warrant a careful investigation.

In this connection, we have attempted by medication, and feeding of high calcium foods, to stimulate an increase of the calcium content of the saliva. Calcium

* Vol. II, No. 3, Page 247.

Chloride and Calcium Lactate were given in 45 grain doses, daily, both alone, and in conjunction with Phosphorous 1/100 grain doses. In no case was there an appreciable rise in the calcium determination of the saliva, even after two weeks of such forced feeding. It seems evident that the amount of calcium to be found in the saliva of each individual is determined by some factor other than the amount of calcium ingested—a factor related to the secretory capability of the salivary glands.

We were interested in the estimation of calcium in salivas of those individuals in whose mouths tartar collected with great rapidity. We wished to know if an exceedingly high calcium content might be found, but in each of the several cases examined, the amounts determined, were below .0030 grms of CaO in 25 ccm. This is then another proof of the view that the formation of salivary calculus is not dependent upon an excess of calcium salts in the saliva.

ACIDITY AND ALKALINITY OF THE SALIVA.

We have discussed the acidity and alkalinity of the saliva at some length in our previous reports, and have by various means, determined the actual amphoteric properties which it possesses. The more recent work of Mr. Wm. Marshall, of the University of California, as published in the American Journal of Physiology for February, 1915, has revived the interest in this factor as a determining influence in the process of dental caries. By the method of titration of saliva with both alkalis and acids, Marshall estimates what he calls the total neutralizing power, which is the sum of amounts of acid and alkali with which they will combine. He carries out this method of titration on two samples of each saliva, one a normal resting saliva, which is collected without stimulation, and the other collected by chewing paraffin. The total neutralizing power of each is determined and one is divided by the other, the resultant quotient being designated as a salivary factor. It is stated by the author of this method, that this salivary factor thus obtained, bears a direct relationship to the immunity or susceptibility of the teeth to caries. That in all cases of susceptibility, the factor is 80 or above, and that in cases of immunity, it is below 80. Due to our interest in the work which was reported, we have attempted to duplicate as closely as possible the method which was suggested, and have carried it out in a considerable number of cases. We found that, in the same individual, as a rule, the factor was fairly constant from day to day and that in the cases of distinct immunes, the factor corresponded with the rule, with the exception of one case, which was that of a young man who had never had any dental caries, and his factor was 105. In the susceptible cases, the results did not at all agree with Marshall's rule, as but few of them had a factor of 80 or above.

SALIVARY FACTOR OF POSITIVELY IMMUNE CASES.

Patient	UNSTIMULATED			STIMULATED			
	N/200 HCl	N/200 NaOH	Neut. Power	N/200 HCl	N/200 NaOH	Neut. Power	Factor
Evans	18.92	6.34	25.26	43.42	8.14	51.56	49.27
McCormick	18.72	6.00	24.72	31.78	5.20	36.98	66.84
	12.26	1.08	13.34	16.89	2.51	19.40	68.76
Cole	13.76	7.04	20.80	30.04	5.14	35.18	57.98
Kellogg	21.40	12.44	33.84	29.72	2.52	32.24	105.00
Serfontein	14.72	7.40	22.12	31.16	3.84	35.00	63.19
Steele	13.90	8.28	22.18	29.34	5.00	34.34	64.58
DeCamp	17.72	5.00	22.72	22.00	6.08	28.08	78.89
Rynearson	12.98	16.84	29.82	34.46	10.88	45.34	66.50

SALIVARY FACTOR OF SUSCEPTIBLE CASES.

Patient	N / 200 HCl	N / 200 NaOH	Neut. Power	N / 200 HCl	N / 200 NaOH	Neut. Power	Factor
Dennison	16.34	9.14	25.48	28.80	6.48	35.28	81.68
Burch	8.48	5.98	14.46	20.68	4.78	25.46	56.81
MacDonad	11.74	11.54	23.28	30.64	4.20	34.84	66.81
Goldman	10.46	7.42	17.88	35.18	4.34	39.52	56.96
Fuller	25.70	6.52	32.22	35.46	6.10	41.56	77.59
Charnock	30.90	5.06	35.96	36.96	3.36	40.32	89.18
Pettit	10.32	12.05	22.37	20.01	6.08	26.09	85.73
Brunner	18.72	7.32	26.04	32.38	2.74	35.12	74.16
Grover	15.42	5.80	21.22	36.90	3.80	40.70	52.14
R. W. B.	13.75	7.66	21.41	31.47	4.27	35.74	59.90
"	12.26	4.68	16.94	23.92	4.24	28.16	60.15
F. H. W.	14.22	7.25	21.47	33.88	5.44	39.32	52.49
"	17.43	5.51	22.94	38.78	4.81	43.59	52.62
"	15.08	6.05	21.13	37.59	2.60	40.19	52.57
Hapeman	19.34	8.36	27.70	37.32	5.48	42.80	64.70

Samples of saliva were collected from a group of children who were of the ages at which caries might be expected to occur. The estimated factors in these cases varied over a wide range, some being very low and others high, no definite relationship being apparent between them and the condition of the teeth in the respective mouths.

SALIVARY FACTOR OF CASES OF PREGNANT WOMEN.

	UNSTIMULATED			STIMULATED			
	cc	cc		cc	cc		
Patient	N / 200 HCl	N / 200 NaOH	Neut. Power	N / 200 HCl	N / 200 NaOH	Neut. Power	Factor
Mrs. A.	9.94	11.20	21.14	24.12	5.80	29.92	70.65
Mrs. A.	9.80	7.60	17.40	25.94	13.18	39.12	44.47
Mrs. Sn.	4.22	10.66	14.88	22.26	4.98	27.24	54.62
Mrs. Sn.	12.42	10.24	22.66	19.96	5.88	25.84	87.69
Mrs. Chn.	3.00	11.52	14.52	13.04	4.84	17.88	81.20
Mrs. Chn.	1.16	4.30	5.46	15.62	3.98	19.60	49.79
Mrs. Sr.	10.68	19.22	29.90	13.98	10.18	24.16	125.75
Mrs. V.	7.68	14.64	22.32	40.06	4.60	44.66	49.97
Mrs. O.	20.01	9.18	29.19	27.28	3.62	30.90	94.43
Mrs. O.	20.02	8.76	28.78	27.54	6.00	33.54	85.80
Mrs. Ms.	7.10	12.00	19.10	30.00	3.80	33.80	56.51
Mrs. Mg.	21.40	5.12	26.52	34.00	3.52	37.52	70.68
Mrs. B.	10.68	10.58	21.26	25.90	4.50	30.40	69.91
Mrs. R.	9.36	5.00	14.36	32.34	3.50	35.84	40.06
Mrs Cn.	10.42	7.20	17.62	26.06	3.82	29.88	58.97

This method was also applied to a number of cases of pregnant women in the maternity ward of the University Hospital and these were followed for several successive days. The most remarkable feature of the results obtained, was that the factors were not constant, but varied thru wide limits from day to day. Altho these cases are supposedly susceptible, there were as many factors below 80 as above, and no definite relationship was evident.

As we have studied the salivary factor of Marshall in its relationship to mouth conditions, we are not able to find a reasonable basis upon which a theory of caries control might be built. The only possible influence with which the acidity and alkalinity may affect the process of caries, is that of neutralization

of the acids of caries, or by favoring the growth of the caries organisms. In neither of these regards, do we see any correlation or direct relation of the salivary factors of the saliva. We further fail to find corroboration of the theory in the data which we have obtained from our studies of this method.

In this connection we used the above method of titration for acids and alkalies in saliva which had been collected under various forms of stimuli, for the purpose of determining what reactions took place in that secretion, in response to stimulation by acids, alkalis, and bland substances. The stimuli used, were paraffin, lemon, grape fruit, and lime water. The method of making the test, was that of holding the acid or alkali in the mouth for two minutes, and changing the fluids frequently. The mouth was then thoroly washed with distilled water, and the subject waited five minutes after which time he began to collect his saliva without stimulation. In each case cited in the table given, three samples of saliva were taken from each patient, in succession, one unstimulated, and the other two stimulated by the substances, and in the order indicated. The most striking feature of the data thus obtained, is the close similarity of results obtained by the various forms of stimuli. The difference in the reaction of the salivary glands toward the chewing of paraffin and the collection after stimulation by acids or alkalis, are nearly alike. We see little evidence of a marked increase in the alkaline elements and a decrease of acidity following the use of acid mouth washes, over that of the paraffin or alkaline stimulation, nor, conversely, do we see a large increase of the acidity of the salivas in response to alkaline mouth washes.

It is true that a possibility of error exists in the fact that some of the acid or alkali may have remained about the teeth to influence the readings of the saliva which was collected. But every precaution was taken to thoroly rinse the mouth and to empty it several times during the five minute interval before the collection began. We also alternated the acid and alkali in several cases to note the difference in response, but our results in any case, were fairly uniform and definite enough to indicate that the reaction of the saliva in response to different stimuli does not vary as widely as we had formerly supposed.

ACIDITY AND ALKALINITY OF SALIVA UNDER VARIOUS STIMULI.

Patient	2/200 HCl	2/200 NaOH	Neut. Power.	Stim.	2/200 HCl	2/200 NaOH	Neut. Power.
R. W. B.	13.20	7.10	20.30	Paraffin	27.84	4.42	32.26
"				Lemon	20.78	4.94	25.72
Dennis	20.02	16.10	36.12	Paraffin	34.18	8.02	42.20
"				Lemon	24.64	8.94	33.58
Brunner	18.72	7.32	26.04	Paraffin	32.38	2.74	35.12
"				Lemon	33.76	5.60	39.36
Graham	14.70	11.70	26.40	Lemon	25.04	8.42	33.46
"				Lime Water	22.84	6.34	29.18
Finch	19.40	4.08	23.48	Lemon	25.18	3.22	28.40
"				Lime Water	34.10	1.64	35.74
Schmutzler	19.78	8.36	28.14	Lemon	26.84	7.86	34.70
"				Lime Water	25.36	5.54	30.90
Phillips	21.48	12.70	34.18	Lime Water	13.00	8.66	21.66
				Grape Fruit	14.78	7.84	22.62

It is very evident that, as a rule, the stimulated saliva differs from the normal resting saliva, in that the alkaline elements increase to a marked degree and the acids decrease slightly. From which we may infer that the stimulation of the saliva by foods has a beneficial effect in that it raises the alkalinity of the secretion, and that this effect may be induced by the mechanical stimulation of the chewing of gums or paraffin at intervals between meals.

ENAMEL SURFACE.

In our further studies of the enamel surfaces, we followed the lines which we laid down in our report of last year. The condition of the enamel surfaces was judged by impregnating them with silver nitrate and then cutting sections from the teeth for microscopic examination. We found that there were two distinct forms of enamel penetration by the silver nitrate, which were due to the physical properties of the enamel. In one case, a distinct black mass is introduced into the enamel, from the surface, for varying distances, seemingly in the form of black metallic silver. In the hard and dense varieties of teeth, this penetration is but a short distance, and in the form of tube-like spaces intermittently distributed over the surface. In the softer and poorly calcified varieties of teeth, the penetration is deeper and may form a solid mass of black stain, extending over the entire enamel surface.

A second form of penetration is seen which may occur alone, or in conjunction with the former variety. This is a diffuse stain which is dark brown in color. It is evidently the result of penetration of silver stain into the enamel from its surface, but differs from the solid penetration, by virtue of the fact that the substance of such enamel is more dense than in those cases in which the heavier stain prevails. It is to be regretted that the microphotographs which have been made from these sections do not give evidence of this difference in the character of the stains. The brown and the black register alike on the photographic plate, so that the type of these penetrations can only be appreciated by the actual examination of the original slide under the microscope. In the photographic reproductions which have been made, we have attempted to reproduce them as nearly as was possible by that process, but we are forced to leave much to descriptive interpretation.

The teeth whose sections are shown in Figures 1 and 2, were hard, dense variety, bicuspid and incisor, taken from the jaw of a negro. There is in each case, a slight penetration by separate openings into the surface of the enamel. The diffuse dark stain thruout the enamel is but a surface stain, caused by the carrying over of the silver salt in grinding and its subsequent precipitation on the surface of the section. It will be noted that in Figure 2 the incisal edge of the enamel has been worn off slightly by abrasion, and at this point no penetration of the enamel by the silver has occurred, except at the crack which existed in that region. Several similar cases were sectioned, and in each the abraded surfaces were impervious to the entrance of stains.

Figure 3 is a section of a perfect central incisor, having a high natural glaze and in which there is practically no penetration by the silver salt. The Striae of Retzius are to be seen stained upon the cut surface of the section, but the external border of the enamel is seen to be free from surface penetration.

An upper cuspid having a high polish on its labial, is shown in Figure 4, and the penetration is in this case very slight. The polish was due, either to prophylactic treatment, or to extreme brushing of the tooth. A similar case of an upper molar is shown in Figure 5, in which a highly polished buccal surface had been attained by vigorous use of the tooth brush. The penetration is slightly greater than in the preceding

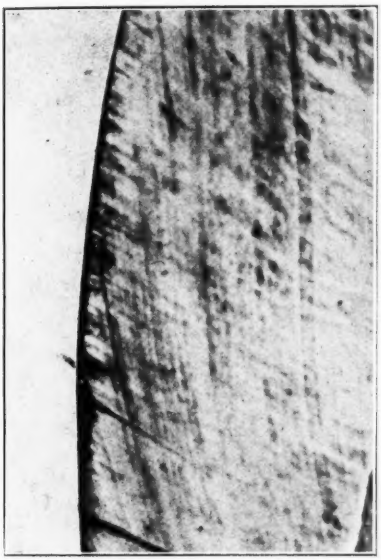

Figure 1.

Figure 2.

Figure 3.

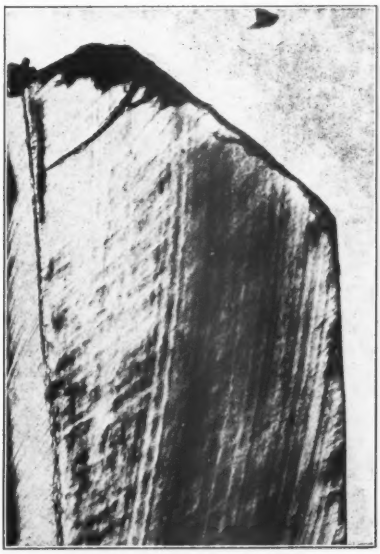

Figure 4.

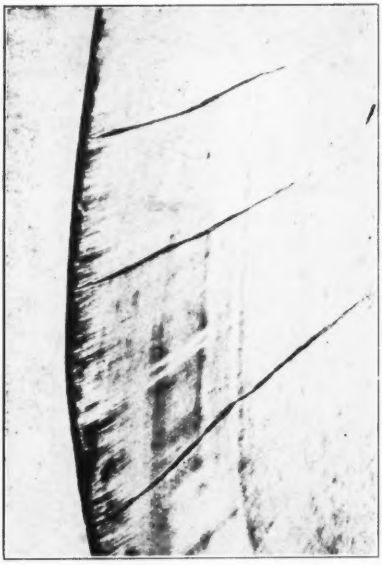

Figure 5.

Figure 6.

Figure 7.

Figure 8.

Figure 9.

Figure 10.

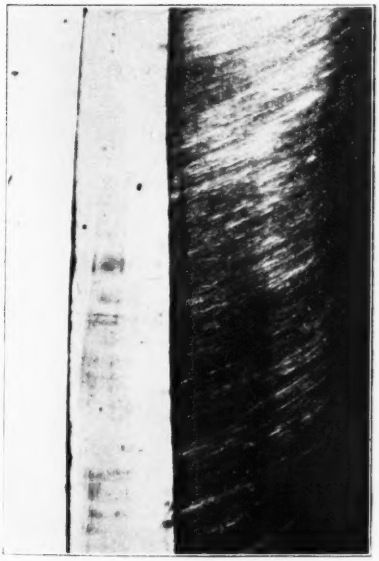

Figure 11.

Figure 12.

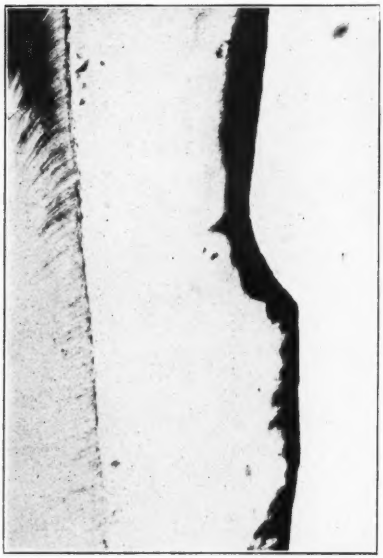

Figure 13.

Figure 14.

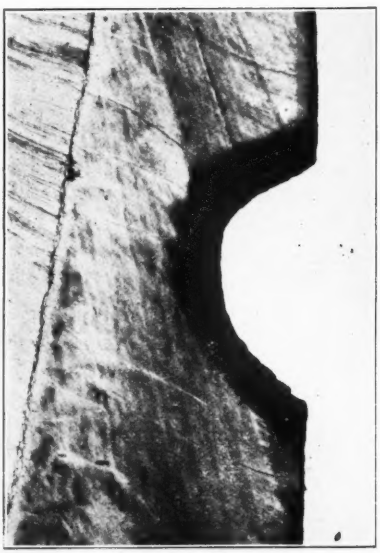

Figure 15.

Figure 16.

Figure 17.

Figure 18.

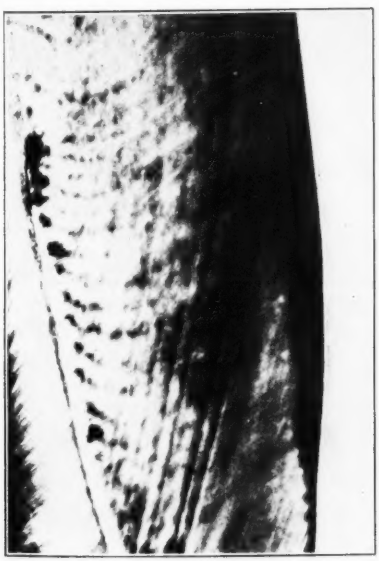

Figure 19.

Figure 20.

case, but not nearly as great as on the lingual surface, which is not shown.

Turning now from the better, and more solid forms of teeth, to those which are soft and poorly formed, we see in Figure 6, a bicuspid which is white and mottled in appearance; in Figure 7, an upper central which was white and chalky, having considerable caries, and Figure 8, which is that of an area of hypoplasia of the enamel, in all of which a heavy penetration of the black silver stain is very evident. Figure 8 is interesting in that it shows a marked area of hypoplasia in the dentin, corresponding to that of the enamel.

Figure 9 shows the deep penetration of silver stain in an unerupted third molar, taken from a mouth in which the enamel of other teeth was firm and dense. Figure 10 is taken thru a "white spot" on the approximal surface of a bicuspid, showing the deep penetration of the silver in an area of carious decalcification.

The teeth of a number of animals, both small and large, were subjected to the silver solution, and it was found there was little or no penetration as a rule. Figure 11 is such a case, while others had a heavy stain on the surface of the enamel, similar to that of Figure 12, but the stain did not seem to penetrate the substance of the enamel.

We then made a long series of studies in the attempt to so treat, burnish, or polish the surface of the enamel, that it might be made more dense, and completely impervious to the silver nitrate. In some cases the surface of the enamel was reduced with a stone to cut thru and remove the outer porous portion of the enamel. This ground portion was then polished with disks, and polishing powders, until a glassy surface was obtained. When such teeth were subjected to the silver nitrate, and sections made, it was seen that there was little or no black silver penetration but that there was a marked staining of a diffuse brown character, quite unlike that of the original surface. It is to be regretted that the difference in these stains cannot be shown in the photographic reproduction.

Figures 13 and 14 are two teeth which are similar to many which were ground and polished. In these, the untouched surface is seen in the lower half in which a heavy deposit of black silver has penetrated a varying distance into the enamel. Above this, the substance of the enamel is seen to be reduced by emery disks, and over this surface there is a heavy penetration of a diffuse dark brown stain, clearly indicating that such a surface is of different character to the original. In the original sections of teeth so treated, the surface is seen to be penetrated by wedge shaped masses of silver, which seemed to indicate that the surface of the enamel had been mechanically injured by the grinding and polishing.

The dense enamel of a negro tooth is shown in Figure 15. A distinct transverse groove was cut in the liabial surface with a stone, and then polished. The result was that the penetration was much deeper in the cut than in the original surface. By such grinding, the physical integrity of the enamel was clearly disturbed, so that the subsequent polish failed to return it to its normal density of surface.

Figures 16 and 17 are pictures of enamel surfaces which have been rubbed with finely ground silex or orange wood sticks. The surfaces were rubbed to an apparent polish and subjected to silver nitrate. The result is that such surfaces have been penetrated by a heavy, brown stain, to a varying degree, and on the extreme surface, small wedge-like masses of black stain are seen to be scattered intermittently over the area so treated.

Figures 18 and 19 are of enamel, which have been rubbed with silex on the orange wood stick and have subse-

Figure 21.

Figure 22.

Figure 23.

Figure 24.

Figure 25.

Figure 26.

Figure 27.

Figure 28.

Figure 29.

quently been polished with oxide of tin on a felt wheel. Even tho a highly polished surface was attained, there was a considerable penetration of stain. There was little of the black silver, it being deposited in small short spindles going in but a short distance from the surface. A diffuse brown stain extends in considerably deeper, and is very heavy.

During this study, we received from Dr. Carmicheal, two teeth which he had polished with "Carmi-cleaner" and "Carmi-lustre." These teeth possessed a very high lustre, due to the polish which had been given them, but when they were subjected to silver nitrate and sectioned, a heavy penetration of both the black and brown order of stains was seen, as shown in Figures 20 and 21.

The results of the above work have very clearly indicated to us that the grinding and cutting of enamel causes defects and injuries in the surface of such tissues that are not possible to eradicate immediately. No method of polishing, of which we know, will condense or burnish the surface of ground enamel, to make it at once dense, and impervious to liquids. We do believe, as stated last year, that such polished teeth in the mouth, and in the presence of saliva which has a normal amount of calcium salts, do undergo a solidification which makes them more condensed, and less pervious to extraneous fluids. We have come to this conclusion, because of the consolidation changes which we have seen occur as the result of slow abrasion, continued prophylactic treatment, and the experimental carrying of teeth in salivas for a considerable space of time, as noted below.

As a continuation of the series which we reported last year, several teeth were polished, sawed in half, lengthwise, and one half was placed in a test tube to be covered each day with saliva of a certain individual, while the other half was kept in water as a control. Several such

experiments were run for 30 days each, and in many a distinct difference in penetration of the two halves of the same tooth were seen, after subjection to silver nitrate. These differences in staining are much more evident in the original slide, than in the photographic reproduction. Figure 22 shows the control of such a case, and Figure 23, the same tooth, carried in saliva of a student whose calcium content of the saliva was high. The change which is noted in this case, was attained in 30 days. It may be supposed that could the experiment have been carried for a longer time, more pronounced effect might have been attained, but it was found that our subjects could not be depended upon to carry such an experiment faithfully for a longer period of time.

Sections shown in Figures 24 and 25 are taken from the corresponding places in another tooth. No 24 being the control, and 25 the half which was carried in saliva 30 days. A more marked difference is to be seen in this than in the former case.

Figures 26 and 27 are of another such case, being before and after, respectively. The photograph does not adequately represent the change which is evident in the original sections.

The last experiment shown, is that of a tooth, one half of which was placed in a test tube, and covered with saliva, the tube being rocked in a tippler so that the fluids were constantly changed. A marked improvement was seen in the surface of the half so treated, Figure 29, when compared with the half which was kept for control, Figure 28.

As was stated above, the foregoing is but a tentative report of a portion of the work which we have carried on during the past year. The data which we have obtained, present many points of interest, and open avenues of research upon problems which are little understood at the present time, and which we intend to investigate, in our future studies.

REPORT OF THE ACTING MANAGING DIRECTOR OF THE RESEARCH INSTITUTE TO THE NATIONAL DENTAL ASSOCIATION.

July 22, 1916.

THE Research Institute of the National Dental Association is the name of the incorporated Scientific Foundation and Research Commission, in accordance with Chapter 10, Section 2, of the Constitution and By-Laws of the National Dental Association, Section 1 of which created the Scientific Foundation and Research Commission and Section 2 instructed them as to their duties, in part as follows:

"To raise funds; to disseminate scientific knowledge, to establish and encourage research; to organize and incorporate a corporation to be known as the National Dental Research Foundation and Institute, or such other name as the Commission shall select, which corporation shall receive, invest and disburse all moneys provided by the Commission and by themselves. They shall organize this corporation in accordance with the laws and requirements controlling such institutions, except that not less than one-third of the trustees of the said corporation shall be provided by the National Dental Association (6 out of 9 are actually from the National Dental Association). This corporation shall seek bequests, endowments, fellowships, and such other contributions as shall perfect the purpose and plan of the National Association. * * * * * * "

The Research Commission has been working diligently and continually, since its creation July, 1913, for the fulfillment of these duties placed upon it and has reported, in full detail at each annual meeting, to the Trustees and House of Delegates, all plans for endorsement and improvement. These have always received unanimous and enthusiastic endorsement and assurance of support. At the last annual meeting held at San Francisco on September 5, 1915, the report stated in detail that the charter had been taken under the laws of Ohio on June 28th previously. The full text of the charter was presented and full explanation why efforts to secure a charter in some other states had failed and why Ohio's law was deemed best, and that the Research Commission had unanimously instructed its Executive Board to proceed to Cleveland on September 25th to complete the organization. This was done precisely as reported and as had been worked out in detail by the Research Commission. A part of the equipment that had been recognized from the first as essential for the development of an efficient department was a principal place for doing business, as required by law, including the administrative and secretarial departments. Plans for a building had been drawn at the request of the Commission and had been received and approved at the meeting of the Commission in Rochester, which building was to cost approximately $68,000 without the land. At the time of the meeting of the Commission and National Dental Association at San Francisco, no definite plans relative to a property were in mind, but a few days prior to the special meeting for the organiza-

tion of the Research Institute which occurred on September 25, 1915, a property was offered for sale in Cleveland of such unusual adaptability for the work, and at a price so reasonable, that the Trustees decided, tho suddenly, since quick action was imperative, to purchase the property, for it had been continually recognized that an equity in personal property and a principal place for doing business were essential for the securing of endowments, as well as for the carrying on of the work. Independent appraisers valued the land alone at $45,000, and the buildings, a Pompeian Tapestry brick residence and barn, cost $75,000 only sixteen years ago. This action has proved to be a most fortunate and helpful item for the development of the work, for the equities of the Research Department have increased more since that date, September 25th than in the entire three years preceding, and with the exception of an exceedingly small per cent of the dental profession, this action has met with most enthusiastic and complete approval, as evidenced by the fact that in this short time they have provided $30,204.00 of the $50,000 required for purchasing the property, and many who had made subscriptions to the support of the researches have not only made subscriptions to the Building Fund but have increased their subscriptions to the Research Fund, because of the acquisition of the buildings.

Notwithstanding this most enthusiastic and certain approval on the part of the profession, as evidenced by the fact that approximately thirty different states have taken part in the contributing of the $30,000 already provided, it was unfortunate that the Trustees did not have the knowledge of this particular building to report to the profession at the California meeting. They did, however, before taking final action, submit the matter in a detailed letter to the full membership of the Research Commission for their approval or disapproval, and did not receive one single objection and all replies were enthusiastic approvals. They also regret that, at the time the matter was submitted to the full membership of the Commission, it was not also submitted to the Trustees of the National Dental Association for their counsel as well, not because this was necessary, since full power had been given, but to secure the largest possible counsel, which the Commission has always endeavored to do.

While the headquarters for the research work are located geographically within a few counties of the center of population of the United States, the location is not a matter of great importance, so far as the work is concerned, except for convenience and for efficiency in securing endowments. The property purchased has about thirty splendid rooms, which are all well lighted and are proving to be about as well adapted to the work as they could have been had the building been built especially for the work. During the three previous years the National work has been housed in quarters provided gratuitously by the Chairman, which space it had finally entirely overflowed.

The activities of the Research Department for the past year have included the following various fields:

The conducting of researches under grants in eight different cities.

The conducting of researches in the Research Institute.

The securing of cash by collections from pledges, and new pledges.

The raising of funds for the purchase of the buildings and property.

The equipment of the building for administrative and research purposes.

The securing of endowments for the maintenance of the work.

The publicity of research reports.

A campaign of general education by lectures and correspondence.

The organization of research and study clubs.

The supplying, at cost, of tungsten, molybdenum and palladium, and their combinations, and a flux for tungsten, to the members of the dental profession.

Development of the details of the organization of the corporation.

We will discuss these in the above order and after reviewing the work of the past year as it relates to each, we will make our recommendations regarding each for the future.

THE CONDUCTING OF RESEARCHES UNDER GRANTS IN EIGHT DIFFERENT CITIES.

All the researches previously organized and established have been continued thruout the past year, and three new ones were added. These have been as follows:

"Studies on the Relation of Mouth Infections to Systemic Infections," under the direction of Thomas B. Hartzell, M. D., D. D. S., assisted by Arthur T. Henrici, M. D., Donald McCarthy, D. D. S., and William Grey, D. D. S., in the University of Minnesota, Minneapolis.

"Studies on the Peridental Membrane," by Frederick B. Noyes, B. A., D. D. S., in the University of Illinois, Chicago, Illinois.

"Studies on the Saliva and on Dental Caries," under the direction of Russell W. Bunting, D. D. Sc., assisted by Miss Florence Wixon, in the University of Michigan, Ann Arbor, Mich.

"Studies on Dental Cements," under the direction of Marcus L. Ward, D. D. Sc., assisted by Ralph M. McCormick, M. S., in the University of Michigan, Ann Arbor, Mich.

"Studies on Salivary Deposits," by Percy R. Howe, A. B., D. D. S., in the Forsyth Dental Infirmary for Children, Boston, Mass.

"Studies on the Relation of the Glands of Internal Secretions to Dental Problems," by William J. Gies, M. D., Ph. D., in the Columbia University, New York City. This work is being done in co-operation with the New York State Dental Society.

"Studies on Root Canal Fillings," by John R. Callahan, D. D. S., in the Cincinnati General Hospital, Cincinnati, O.

"Studies on Mottled Enamel and Brown Stain Deformities," by Frederick S. McKay, D. D. S., of Colorado Springs, Colo.

"Metallurgical Problems," under the direction of Frank A. Fahrenwald, E. M., M. S., Ph. D., in the Research Institute and Case School of Applied Science, Cleveland, O.

"Differentiations in Mouth Infections," by Weston A. Price, M. S., D. D. S., assisted by Le Rue P. Bensing, A. B., Cleveland, Ohio.

"Galvanic Medication, including Electric Ionization," by Weston A. Price, Cleveland, Ohio.

Many of these reports are being given more or less in detail at this meeting and we are sure you will be greatly profited by them. Some of them mark very distinct advances for the past year. With exception of our special recommendations under a different heading in the closing paragraph relating to the metallurgical researches, we would recommend that these researches be continued and, if possible, some additional ones be established.

THE CONDUCTING OF RESEARCHES IN THE RESEARCH INSTITUTE.

Owing to the very limited funds, the work in the Institute has been established very slowly this year and limited to metallurgical, physical and bacteriological studies. About $4,000 worth of equipment has been donated to the Institute and the building and equipment will be in splendid readiness for the expected enlargement of the work as it will be established this Fall. In connection with the oral infection studies, a considerable number of patients have been cared for, furnished almost entirely by the Associated Charities of the City, consisting

largely of more or less seriously crippled patients with Arthritis Deformans, Acute Rheumatism, Chronic Digestive Disturbances, Neuritis, etc. Incidentally, many of these patients have been greatly benefited and the study of their cases will contribute to our total knowledge of these conditions. Several of these will be reported in detail in a special report on mouth infection studies.

THE SECURING OF CASH BY COLLECTIONS FROM PLEDGES, AND NEW PLEDGES.

A great deal of effort has been required this year to make collections and literally scores, if not hundreds, have written finally, assuring us that it was nothing but carelessness by procrastination. We started in last Fall with a budget of $12,000, and cash on hand $4,426.10. The cash receipts from August 3, 1915, to June 20, 1916, including the above item of cash on hand August 3, 1915, have been $16,537.48. The disbursements for the current year's various activities have been—current year's budget appropriations for researches in eight different cities $11,211.91; previous budget appropriations $258.56; special budget appropriations $2,044.14, making a total of $13,514.71 and leaving cash on hand June 20, 1916, to begin the 1916-1917 fiscal year, of $3,022.77. Correcting this up to July 22, 1916, we have $5,485.44, of which $748.48 has been expended to this date on the work of the new fiscal year and $250.00 on a previous special appropriation for patents, which are being assigned to the free use of humanity. A complete financial report is herewith appended. New pledges have been secured during the past year for $17,368.75. Our recommendations regarding this branch of the work are as follows:

The pledge system always has been intended to be, and always has been explained as being, simply a temporary procedure for the organizing and establishing of the work. Only after competent organization and establishment could endowments for permanency be secured. We are now at that point, having established the four requisites, which are universally recognized by experts, namely:

1. An organization competent and legally qualified to receive and trust funds.

2. A headquarters and principal place for doing business, as required by law.

3. To have demonstrated ability to fulfill the mission for which the endowments are asked.

4. An adequate moral and professional support from the dental profession, the laity, and the medical profession.

The only one of these lacking is the adequate support of the dental profession. This Research Department must be established above all else as being an indispensible and inseparable component part of the National Dental Association, which can only be done in fact, as well as in name, by having every member of the National Dental Association an indispensible and inseparable part of the Research Department. This, and all problems and questions relating to a separation of the two, will be forever settled and only so when membership in the National Dental Association is made contingent upon both moral and financial support of the Research Department. Please note—not an optional support but an unconditional support. The Research Department must in turn remain absolutely under the control of the National Dental Association, in which condition it is and apart from which it cannot exist. After a great deal of study of this matter, your Research Commission and Trustees of the Research Institute have decided that the simple and efficient method for accomplishing this is to have the membership in the National Dental Association contingent upon each member paying the interest on a certain sum of principal endowment,

which sum we recommend as $20.00, the interest on which will be $1.00 annually. This principal may or may not be paid in by the member, as he chooses, and when he does he shall cease to pay the $1.00 interest, for the $20.00 will be invested and only its interest used and he, therefore, becomes a perpetual member of the National Dental Association in the support of the research work. This plan was first announced less than four months ago, when the Trustees of the Research Institute decided that the time had arrived for starting the endowment fund, which they unanimously agreed to start with the dental profession. In this short period, we believe that one of the most remarkable and impressive incidents that has ever happened in the dental profession has occurred, in that about one-third of the entire membership of the National Dental Association has adopted this plan, which was possible because of their having their annual meeting during that period, and many other states have signified their desire to do so as soon as they can have a regular meeting. This plan will supersede the temporary pledge plan and, while it would have been convenient and fortunate if conditions could have been such that this action could have been delayed for a year, it is not possible to delay it because of the fact that the temporary five year pledges used for establishing and organizing the work begin terminating in large number next year, many subscribers having already paid up their entire pledge, and it would be fatal to the work to curtail its activities and retreat, for while there is nothing that succeeds like success, there is nothing that fails like apparent failure. The accompanying map illustrates, graphically by the states being marked black, that a large part of the entire country has already adopted this basis and, incidentally, we must call your attention to the fact that states that have acted favorably are not the older and wealthier states where the profession is well established and where its members are receiving substantial fees. The amount of time, the income of which is requested, may represent from one-half to one hour out of the year in many of these newer and rougher states, while in the older states it would represent the income probably on an average of from ten to twenty minutes during a year of the average dentist. It is a very significant fact that in not one single instant where the Chairman has presented the work of the Institute and the plan for its permanent endowment, beginning with the profession, has a state or society failed to unanimously adopt the plan. Several states have taken this action, and we understand all have done it unanimously, on the strength of the facts of data submitted by correspondence and by presentation by other members of the Commission.

THE RAISING OF FUNDS FOR THE PURCHASE OF THE BUILDINGS AND PROPERTY.

Probably no problems entailed in the establishment of a comprehensive research department for a great healing profession has required so much study and familiarity with the facts sufficient to establish faith and confidence as has been necessary for this department of activities. A true test of faith is found in matters that involve financial risk. Since the Trustees of the Research Institute are individually liable, under the laws of Ohio, for its debts, it required some faith in the worthiness of the work and confidence in the dental profession and in humanity, to purchase a property at $50,000, when less than fifteen hundred dollars was in sight. That this confidence was not misplaced by those who took the initial, financial risk, is shown by the fact that, as previously stated, over three-fifths of the entire amount required has already been pledg-

ed and nearly two-fifths paid in. The balance will be provided in the same spirit. Many states have not had an opportunity to take action, relative to making a contribution to the Building Fund. It is the policy of the Trustees of the Institute that, as states shall put into effect the one dollar dues plan, the persons within that state who have made five year pledges for the support of the research work, shall be given the privilege of doing one of three things with their pledge, either the first or second of which we recommend—namely that the immature and unpaid payments be transferred to the Building and Equipment Fund, or that it be continued as at present for the support of the Research Fund, or that it be terminated altogether. It is a hardship for some to continue these subscriptions and for such we recommend their termination as a matter of equity and justice. However, we believe there will be enough who can afford to do so and who will gladly transfer their pledge to the Building Fund, so that it can soon be closed as being provided for and the universal effort can then be concentrated on the last great task, namely, that of securing an ample endowment. The property that has been purchased as the headquarters is increasing in equity at the rate of about ten per cent a year, as is all the property in its vicinity, and since we do not have to pay taxes, being an eleemosynary institution, and, since the buildings are in such excellent repair, the National Dental Association will soon have a very valuable equity in realty, and it could, at this moment, receive more for its property than its purchase price. Its location is one of the best for land value increase in the city of Cleveland, it being one of the famous Euclid Avenue homes that are rapidly being sacrificed as residences because of the encroachment of business. Many of the states have already taken action in providing funds for the purchase of the building. These and their amounts are as follows:

	July 25, 1915.
Cost of property	$50,000.00
Amount secured to date, in cash and pledges	30,204.89
Balance to be raised	$19,795.11
Colorado	$ 705.00
Connecticut	100.00
Georgia	1,425.00
Illinois	705.00
Iowa	1,555.00
Kansas	660.00
Maryland	500.00
Massachusetts	110.00
Michigan	200.00
Kentucky	300.00
Minnesota	100.00
Missouri	677.50
New Jersey	105.00
New York	810.00
Nebraska	1,181.50
Ohio	16,177.89
Oklahoma	410.00
Pennsylvania	450.00
North Carolina	507.00
South Dakota	15.00
Southern California	500.00
Tennessee	75.00
Washington	100.00
West Virginia	271.00
Wyoming	15.00
Hawaii	50.00
	$27,704.89
Special Contribution from the Assignor of the property	$ 2,500.00
Total	$30,204.89

THE EQUIPMENT OF THE BUILDING FOR ADMINISTRATIVE AND RESEARCH PURPOSES.

An inventory of the equipment and furnishings in the building shows $6,131.00, and it is particularly gratifying to us that nearly $4,000 of this has been donated without cost to the Trustees. The

Institute also owns equipment that has been purchased with the fund of the department and which is now in the hands of some of the directors of special research. The Trustees have been very careful that no gifts should be received to which were attached any strings, reservations or opportunities for capitalization. We believe it to be very important that this policy of safeguarding the best interests and reputation of the Institution be continued.

THE SECURING OF ENDOWMENTS FOR THE MAINTENANCE OF THE WORK.

One of the largest and most formidable problems connected with this department has been the education of the members of the dental profession, the majority of whom feel competent to have a judgment and make a decision instantly on almost any question that might come to their attention pertaining to research and its complicated requirements, and this even on problems that should take months of study. Few have even yet obtained the vision of what the Research Department of the National Dental Association should be and must be. Many have conceived of it as achieving its purpose in the temporary support, financially, of the effort being made to solve a few limited special problems. Were this the end and object, the enormous expenditure of effort and sacrifice would have been, in no sense, justified, while in view of the real object and opportunity, they have been abundantly justified. Next to the intrinsic merits of the problems confronting the dental profession and its opportunity to serve humanity comes the necessity for ample finances for carrying on this worthy work. No form of financial support is adequate that is temporary. Research workers cannot take up a life work without the question of permanency being established beyond the question of doubt. Only an endowment can be considered as a competent financial security. The Trustees of the Institute are setting their first stakes at one million dollars, the first part of which shall be the $20.00 represented in each member of the National Dental Association, and on which he shall pay the $1.00 interest until such time as he may choose to pay the principle, unless he ceases to be a member of the National Dental Association. The approximately 19,000 members constituting the present National Association will, accordingly, provide $380,000 of the million dollar endowment, an annual income, at 5%, of $19,000, which is a minimum amount competent to establish the work and to absolutely assure its permanency. This amount will be increased as rapidly as bequests and gifts can be secured, and will also be rapidly increased by the increase in the members of the National Dental Association. If the question is raised, which we hope it will be, as to whether or not the adoption of this plan may reduce the membership of the National Dental Association, we have important data that we wish the privilege of submitting, and which has a significant bearing upon it. We believe the ultimate, greatest efficiency and good to the dental profession will come by the dental profession having the largest possible credit for, and control of, this department and we would urge that, as gifts are accepted by the department, they shall always be free from extenuations that will take from the dental profession its much to be coveted prestige in its absolute control. We believe there will not be an embarrassment from this point, provided the National Dental Association shall once have actually established the work on a permanent and competent working basis. There is splendid encouragement that this department will receive assistance from outside its own sources, when it shall have fulfilled the above previously mentioned requisites. This, as has frequently

been stated, will be delayed and decreased by the existence of the war in Europe. While $19,000 or $20,000 will establish and guarantee the permanency of the work, the work cannot be adequately extended and enlarged, as the conditions so greatly demand at the present time, until the endowments shall approximate a million dollars, which will give an annual income of $50,000. This, we believe, can soon be obtained, provided we can have just a little help from every member of the National Dental Association, and shall work as an absolute unit in carrying out adopted policies and plans. One person dragging his oar or back paddling can do more to throw the craft out of its course, or prevent it from making headway at all in the rapids and shoal waters thru which we are going, than can be overcome by hundreds, if not thousands, pulling in the right direction. The Trustees of the Research Institute have confidence of the securing of a large and ample endowment, provided only that we shall have the universal and united support of the members of the dental profession. The one million dollar mark is only the first placing of the goal and will not long be adequate to fulfill the duties and opportunities of the dental profession. In four months time practically one-tenth of the million dollar endowment has been secured by the adoption of the every member dollar plan. This we believe to be the most important question that is now before the National Dental Association, at this —the greatest meeting in its history.

THE PUBLICITY OF RESEARCH REPORTS.

It is almost an impossibility for a Research Department to be maintained efficiently without an adequate medium thru which to carry its message to the profession. There are several features requisite for an adequate Journal for the Research Department, some of the most important of which are that the message shall be delivered quickly, accurately and legibly to the largest possible number, and particularly to those to whom it is directly due. There must be ample space for an adequate statement. It must be possible for the person making the report to assist in editing his final statement. There must be adequate assurance that nothing will be published which shall afterwards be discredited or contradicted. All of these conditions can be provided by the issuance of a National Journal every four weeks, or better every two weeks, and the question of editing and safeguarding the publication of reliable data only, has been anticipated and provided for in the organization of the Research Institute by providing an Advisory Board made up largely of the most skilled medical men, pathologists, bacteriologists, biological chemists and internists in the world, who will act in the capacity of critics of the work that is about to be published. This Board includes such men as Victor C. Vaughan, Ludvig Hektoen, Milton J. Rosenau, Lewis W. Ladd, George W. Crile, Frank R. Lillie, Walter E. Garrey, Charles H. Mayo, William H. Welch, than whom there are few if any higher authorities in their fields in the world, and whom the National Dental Association is greatly honored to have had accept this advisory capacity in the corporation. It is so apparent to every member of the dental profession that The Journal of the National Dental Association should be issued at least monthly, and that the dues should be increased $1.00 for that purpose, as has been promised, and that, notwithstanding the tremendous importance of the research work, The Journal dollar should take precedence over the Research dollar. But while the research department has an imperative need for The Journal on a monthly basis, The Journal, likewise for its success, has an equally imperative need for the worthy enlargement and permanent efficiency of

the Research Department. The Trustees of the Research Institute, accordingly, most urgently solicit the unanimous support of the Association and House of Delegates in the providing of $1.00 per member for the adequate enlargement of The Journal Department.

A CAMPAIGN OF GENERAL EDUCATION BY LECTURES AND CORRESPONDENCE.

This is one of the vital phases of the work and should be enlarged and its burdens distributed. The Acting Chairman of the Research Department has been compelled to spend a great deal of his time on the road, as demonstrated by the fact that, during the last four years, he has made trips to give from thirty-five to fifty illustrated lectures each year before large dental conventions, all by invitation—over 150 in all, and nearly all outside his own state. This work must be distributed and there is no reason why the department should not soon provide several persons who will be competent to present special phases of its work. We strongly urge that this be provided. The correspondence of the department is now so great that it would require most of one person's time to adequately answer the various and varied questions that are being continually asked. A dentist hungry for knowledge should, if possible, get it. Many of these questions can be answered by supplying a reprint of an article covering the question. This can only be done by the providing of the monthly, or semi-monthly, Journal and the publishing of all research articles in a reprint form. A great deal of correspondence is coming from the medical profession.

In this connection, it is a most significant fact that whereas but a few years ago the members of our profession were receiving almost no invitations to present papers and lectures before medical conventions, it is the writer's experience and that of many others that a large number of invitations are coming from that profession, and a great many medical men are asking for special information on dental problems. We would recommend that very special attention be given to supplying the medical profession, as nearly as possible, with their request for dental information.

THE ORGANIZATION OF RESEARCH AND STUDY CLUBS.

If time permitted we would like to present plans for the nation wide organization of study clubs within the membership of the dental profession. No dentist can get the message from a research report who does not even possess the alphabet with which it is constructed. The name of an organism or of a pathological lesion has no meaning for such a dentist, and yet it is a question if ten per cent of the members of the dental profession today could intelligently interpret a bacteriologist's, physiologist's or a histologist's message as he is compelled to give it in the terminology of those sciences. This lamentable condition can only be corrected, and we are glad to say is rapidly being so, by the advent of dentists "back to the books," and to the man who does not go back to the books it means "back to the farm" or "back to the tall timbers." One of the most hopeful and delightful instants in connection with this whole research propaganda is the spirit of the dental profession in its eagerness for knowledge and willingness to study. In the city of Cleveland over fifty men have joined various study clubs and an effort is being made to have every member of that city society a member of at least one such club. This condition obtains, in a greater or lesser degree, in almost every city in the Union, and it guarantees a new era for dentistry. We urge that moral and financial support be given to this branch of the work, which responsibility the Re-

search Department has been accepting because there was no other provision for it. We recommend that the Research Institute outline courses suitable for study clubs, to be published in The Journal of the National Dental Association.

THE SUPPLYING, AT COST, OF TUNGSTEN. MOLYBDENUM AND PALLADIUM, AND THEIR COMBINATIONS, AND A FLUX FOR TUNGSTEN, TO THE MEMBERS OF THE DENTAL PROFESSION.

One of the professional services that has been rendered by the Research Department has been the supplying, in the best possible quality, the rare metals—tungsten, molybdenum and palladium, and their combinations. For example, about $2,000 worth of these products has been furnished at cost to the members of the profession to be used as substitutes for noble metals, particularly platinum compounds. This would represent a net saving to the profession of many thousands of dollars. The fact that many dentists are repeating their orders regularly and periodically, and telegraph or write special deliveries to hurry up their orders if there is a delay, indicates that they are feeling a very definite want in the profession. The department is now supplying, and has here in its booth in the Scientific Exhibits, a limited quantity of these metals for direct distribution, also the new solder and flux for soldering tungsten and molybdenum. It has been very difficult in the past to have these metals developed constantly with the standards of quality essential for our work, but at this time it is so well standardized that we recommend that in the future it be delivered to, and supplied thru, all the dental dealers. In this connection we must state that the intrinsic value of the results of the researches of the Metallurgical department has been such that we have been exceedingly embarrassed with patent situations. We are pleased to report, however, that an arrangement has finally been about consummated with the General Electric Company, which has been producing these products commercially, in accordance with our specifications, whereby the patent they have obtained, covering the production of this material shall not restrict the uses in dental arts, and a properly executed document will be provided to this end, in accordance with extended correspondence and interviews of the Acting Managing Director with the officers of that Company, as verified by the following telegram:

Schenectady, July 21, 1916.

Dr. Weston A. Price,

8803 Euclid Avenue, Cleveland, Ohio.

"Understanding that you fully appreciate no right or license under any other patent conveyed or implied, we will license Dental Research Corporation under Coolidge patent 1,162,342 for dental uses, only with right to sub-license others same purpose. Will have formal agreement executed after your return from Convention."

(Signed) ALBERT G. DAVIS.

This not only removes a very definite embarrassment but establishes a very helpful precedent for the future.

This department has also been greatly embarrassed by the difficulty of retaining, for the Research Department and for the dental profession, the results obtained along metallurgical lines. We are pleased to announce, however, that several patents are pending, some of which we have notice will be allowed, in which the inventor, Dr. Fahrenwald, past head of the Metallurgical Department, assigns his full right to the Research Institute of the National Dental Association, and in the same document the Research Institute dedicates to the free use of humanity. It is important and significant that practically the only embarrassments, that have arisen out of the details of the

conducting of the researches in the various departments, have had to do with the title to, and credit for, the results of the researches. And because the pathological problems are so insistent and important and do not have these embarrassments, the Trustees of the Institute recommend that, for the present while our funds are so inadequate for the various urgent problems, and since the tungsten and palladium compounds are now in condition to be supplied in good quality regularly to the profession, the researches on these problems be suspended for the present and the money used for the less embarrassing and now more important pathological, histopathological and physical problems. These patents will be discussed in more detail in the metallurgical reports. It should be stated here, however, that the Trustees were compelled to take patents on these products and dedicate them to the free use of humanity to prevent themselves, and the entire dental profession, being prohibited from using the very things which they themselves had developed.

DEVELOPMENT OF THE DETAILS OF THE ORGANIZATION OF THE CORPORATION.

The status of the Research Department in the National Dental Association at this moment is that, in accordance with the will of the National Dental Association as expressed in its Constitution, it now has a legally and competently organized Research Department, which cannot exist except as a part of the National Dental Association which elects its active membership. The members of the National Dental Association elect the members of the House of Delegates. These in turn elect the Trustees, who in turn elect the members of the Research Commission, not more than two of whom can be from any one state, to hold office for five years, and who cease to be members of the Research Institute upon their ceasing to be members of the Research Commission. The Research Commission constitutes the active membership of the Corporation. The Corporation is the legally incorporated expression of the Commission, six of its nine Trustees being from the Research Commission. It is, in effect, an enlargement of the Executive Board of five of the Commission to a Board of Trustees of nine in the Research Institute, and an enlargement of the Research Commission of twenty-seven by the addition of the Advisory members from among the medical men, legal profession, bankers, philanthropists, etc., to, at present, forty-five. This plan of organization is in accordance with the best wisdom that could be obtained after very exhaustive study extending over years of time. The present organization while adequate, legal and efficient, is very far from perfect, and must be modified to more perfectly adapt the Research Department to the best needs of the National Dental Association and to make possible its greatest efficiency. Both the Carnegie Institution and Rockefeller Institute found it desirable to change their by-laws a few years after organizing. They advise that we will find it possible after a trial, to make changes to improve ours. The Trustees of the Research Institute recommend that the greatest possible care be exercised in the selection of the men who shall be elected to membership in the Research Commission, for the work must stand or fall on the ability of these men upon whom the active responsibility shall rest. There is no room on the Research Commission for inactive or dead timber. We also recommend, since it is recognized by the leaders of the medical profession, that the fundamental problems underlying the relation of mouth infections to systemic disease must be solved by men having a dental vision, that the dental profession gird itself with renewed vigor, growing out of a univer-

sal co-operation, and press forward the researches on these problems as rapidly and efficiently as possible. To accomplish this we believe that the very best and highest skill that can possibly be secured should be engaged. This program will call for a budget for the coming year of at least $20,000.00. We are confident that all that is necessary is to have the members of the dental profession know of these facts and of this opportunity, and the result can be obtained.

The great world battles being waged in Europe are not more significant in the interest of the coming generations of humanity than the world battles against disease that the healing sciences are waging today, of which the humble efforts of the National Dental Association are a part. Every phase of the development of the work of this department has developed almost precisely in general principle as your committee originally planned, except the lagging appreciation of the dental profession. Your Research Department has carried the flag of advancement thru the first and second line of defenses of the enemy, by its inauguration and competent organization of the research work, and we are now about to attack the third line of defenses by establishing permanency and enlargement by endowments. A few are calling "bring back the flag, you are getting too far ahead of the army." The majority are saying "push forward with the army." The army must either be brought up to the flag or the flag must retreat back to the line of the army. This body will this day decide that question. The recommendation of your Commission, and we believe that of over ninety per cent of the members of the National Dental Association, is that you move up the army. Will you do it? One way is to make membership in the National contingent upon individual support of the Research Department.

Respectfully submitted,

WESTON A. PRICE.

Acting Managing Director of the Research Institute of the National Dental Association.

ITEMS OF INTEREST.

THE NATIONAL RELIEF FUND.

By J. P. Luthringer, D. D. S., Peoria, Ill., Secretary, and Editor of the Illinois State Dental Society Bulletin.

December brings us up to the joyful season of Yuletide. With it is borne upon us a flood of emotions consonant with this cheerful, happy time of charity and good will toward our fellowmen.

As another year totters to its destined end we pause for a spell, take stock of its benisons and from our bounty bestow happiness on those whom we love and who love us. As our senses become attuned to the spirit of beneficence we eagerly claim the rich heritage of the giver as our reward. This year let us augment this pleasure by including in our list a small contribution to the Relief Fund of the National Dental Association.

As in the last several years preceding each member will presently receive an allotment of Christmas Seals. We urge all to acknowledge at once the receipt of these by mailing a check for one dollar in the envelope enclosed for this purpose.

Every member is more or less familiar with the purpose of this fund. It was established within a few years and its function is to provide some relief to the distress and want of our brothers who have encountered reverses and misfortune. Many of our co-workers have grown old in service and are thereby shut out of the possibility of doing much for themselves.

The fund is comparatively small, and as only the interest is used the amount of accomplished good is limited. But this will be something vastly more worth while in years to come if we who are blessed with health and strength will annually contribute our mite.

That there is no inconsiderable number of our calling which finds itself in this regrettable situation must be apparent after some reflection. Commercial agencies, by mathematical calculation, have determined that but ten per cent make a financial success in their business ventures Of the remaining ninety per cent those who are not hopelessly wrecked upon the rocks are playing close to shore, living from hand to mouth and barely eking out an existence. What chance have they to provide for a rainy day? None. And if misfortune befall them they and their dependents must suffer.

Moreover, it is also estimated that ninety per cent of people reaching old age become dependent on others.

It is reasonable to assume that in the main these same figures from the business world hold for men in the professions. Our own experience gained by observation of those about us must add convincing proof of these deplorable facts.

Some professions have established relief funds, homes, etc., for their unfor-

tunate members. We should do likewise. Let it not be said we were heedless when we should have been provident. The need has been proved, the response should not be lacking.

None among us relishes the prospect of ever facing conditions which would make an appeal to this fund necessary, and we hope sincerely none will bring up to this extremity—but we can never tell. At any rate we would do well to indulge in a little forethought for the peace and well-being of the other fellow. —*Illinois State Dental Society Bulletin.*

THE SOUTHERN CALIFORNIA ASSOCIATION OF DENTAL NURSES.

By Edith Wilkerson, Los Angeles, Cal.

A great deal of interest and enthusiasm is being shown by the organization of the Southern California Association of Dental Nurses, which was organized with the idea of increasing the efficiency of the Dental Nurse. This Association is the outgrowth of a clinic and afterwards a course of lectures given by Dr. Frank Holman, President of the Southern California Dental Association. These lectures and clinics were given at the University of Southern California Dental College, which were primarily for the benefit of the Dentists, but the Assistants who attended realized the inefficiency of their own proficiency, and only by an organized effort and study could they perfect themselves to that height to which they aspired.

Dr. Frank Holman, President of the Southern California Dental Association, Dr. Bert Boyd, President of the Los Angeles County Dental Association, and Dr. J. C. Waterbury, Vice-President of the Los Angeles County Dental Association, and one very well versed in the organization of Societies, assisted this Association in its organization.

The first meeting was held in the office of Dr. Frank Holman in the Auditorium Building, Los Angeles, Cal. The officers being as follows: President, M. Elizabeth Mitchell (Dental Nurse with Dr. Lewis E. Ford, Dean of the Dental College, U. S. C.); Vice-President, Sue Dickson, (Dental Nurse with Dr. Louis Felsenthal). Secretary, Phyllis Keys, (Dental Nurse with Dr. J. C. Montague); Treasurer, Helen Wood, (Dental nurse with Dr. J. Walter Grey); Editor, Edith Wilkerson, (Dental Nurse with Dr. G. Maurice Crow).

The meetings are held the second Tuesday in each month at seven-thirty P. M., in the offices of different men of the Profession who have extended invitations to the Association.

At these meetings, papers of interest and value are read and discussed by its members. Different men of the Profession who are present always speak along very instructive lines.

All who are members realize that they have been working in the dark before, and feel that they derive invaluable benefit from each meeting.

Here to date a membership of over thirty and new names being added each month, due to the interest taken and benefits derived.

At the Twentieth Annual Session of the Southern California Dental Association an invitation was extended to the Dental Nurses to have a clinic.

The clinic showed the different steps followed in the daily routine of work in the efficient offices. Commencing with opening up the office in the morning, the meeting of the patient, in the reception room, the assistance at the chair, the bookkeeping, making appointments, the diplomacy used in answering the phone, the laboratory work, proper sterilization and closing the office. These different steps were shown by various members, each assuming a separate roll dressed in the Dental Nurses Uniform. However, all of these steps can be successfully followed and accomplished by one efficient Dental Nurse, along with the Co-operation of her employer.

Great interest was shown by this clinic by members of the Profession who heretofore were not in sympathy with the new movement, showing the height already attained by the Association and its proof of its value to the profession. Dentists whose assistants have taken an active part, in the work, now realize more than before the importance of their work as a Dental Nurse. The members of the Dental Nurses Association realize that the movement is only in its infancy and a great deal of pioneering must be experienced before the ideal, or goal to which they are aspiring may be attained.

RESISTANCE TO INFECTION.

The accomplishment of an infection, Zinsser[1] writes, is not determined merely by the fact that a micro-organism of a pathogenic species finds lodgment in or on the body of a susceptible individual, but it is further necessary that the invading germ shall be capable of maintaining itself, multiplying and functionating within the new environment. An infection, then, or an infectious disease, is the product of the two factors, invading germ and invaded subject, each factor itself influenced by a number of secondary modifying circumstances, and both influenced materially by such fortuitous conditions as the number or dose of the infecting bacteria, their path of entrance into the body, and the environmental conditions under which the struggle is maintained.

This struggle between the host and the invading bacteria represents a situation in which no adaptation has taken place. The conflict may result in a local or systemic manifestation which constitutes disease. In the majority of cases it becomes "mild and locally limited if the protective powers far outweighed the invasive powers of the micro-organisms, violent if the balance is reversed." If it were possible to discover the various means by which the organism so often successfully exerts its powers of resistance and secures a recovery or immunity from disease, the prospect of therapeutic advance in the management of infections would doubtless be greatly enhanced. For this reason there seems at present to be in experimental medicine a growing tendency to study the precise fate of bacteria under conditions in which they experience varying degrees of resistance.

The recent studies of Bull[2] at the Rockefeller Institute for Medical Research, New York, are furnishing interesting facts in regard to the deportment of the micro-organisms in the circulation. It now appears quite probable

[1]Zinsser, H.; Infection and Resistance, An Exposition of the Biological Phenomena Underlying the Occurrence of Infection and the Recovery of the Animal Body from Infectious Disease. New York, 1914, p. 3.

[2]Bull, C. G.; Jour. Exper. Med., 1915, xxii, 484; Further Observations on the Agglutination of Bacteria in Vivo, ibid., 1916, xxiv, 25.

that the power of the blood to cause agglutination determines, in large measure, whether after their direct introduction in an experimental way the bacteria are to be removed promptly from the circulation and septicemia avoided, or whether they are to remain there and produce a blood infection. An inverse ratio seems to exist between the power to produce septicemia and the degree of agglutination of the infection bacteria in the circulation of the host. Thus, according to Bull, virulent pneumococci, dysentery bacilli of the Shiga type, and virulent influenza bacilli do not agglutinate when injected into the circulation of normal rabbits; while typhoid bacilli, dysentery bacilli of the Flexner group, and non-virulent influenza bacilli are agglutinated immediately after entering the circulation of these animals. On the other hand, an intravenous injection of a small quantity of specific immune serums causes an instantaneous agglutination of pneumococci and Shiga dysentery bacilli in the circulation of infected rabbits. The bacterial clumps accumulate in the organs in which they are phagocyted.

In this way it appears that active immunity generally insures the agglutination of specific bacteria when they are introduced into the circulation. The degree of agglutination and opsonization of bacteria, whereby they are readily mastered by the protective phagocytes available, within the body, is inversely parallel to the infectiousness of many bacteria for the host. Stryker[3] has recently ascertained that the growth of virulent pneumococci in homologous immune serum produces variations in agglutinability, decrease in virulence, inhibition of capsule formation, increase in phagocytability with normal serum, and change in absorption power and antigenic properties. Very few passages thru the animal body suffice, however, to induce a reversion to the original type. Bull conservatively points out that the fact of the prominent role or even decisive part played by agglutinins and opsonins in the circulation of infected individuals need not imply that these are the only immunity forces at work or available.—*Editorial, The Journal of the American Medical Association.*

DENTAL SERVICE IN CANADIAN ARMY.

There is now in operation at Toronto, Canada, the biggest and finest military dental clinic in the whole Dominion. The building, 155 feet in length by 50 in width, is the only one painted thruout in white Bright tan and red striped awnings on all the windows give quite a picturesque effect. Since the start of the war the dental clinic in the Toronto military district has by attending to the teeth of recruits made possible the enlistment of ten thousand men who otherwise would have been rejected as unfit for overseas service. In the dental building at Toronto already 100 soldiers are being treated daily, and 450 operations performed. There are twenty-five dental chairs. Sixteen officers and twenty-five N. C. O.'S now compose the dental staff. Later the staff will be increased to about double the number. Capt. W. G. Thompson is commandant of the dental clinic, and much credit is due him for creating such an impressive dental establishment. In the dental stores department, directed by Capt. T. D. Webb, is nearly $10,000 of dental supplies and equipment. The stores include a complete stock of drugs,

[3]Stryker, Laura M.: Variations in the Pneumococcus Induced by Growth in Immune Serum, Jour. Exper. Med., 1916, xxiv, 49.

apparatus and artificial teeth.* The dental building is modern in every way, electric lights in all rooms, also hot and cold water beside each chair. During June there were 13,850 dental operations on soldiers in No. 2 Military District. The general health of the soldiers in camp continues good. There has been no evidence of any spinal-meningitis. The number of contagious diseases in the camp hospital is falling off.—*Army and Navy Journal.*

*It may be of interest to the readers of The Journal to know what Canada is doing in the way of dental service as compared to our own country. They have a Chief of Corps; we have none, not even a member of the Corps stationed in Washington, altho the Nurse Corps has a Chief of Nurses stationed in the War Department: Medical officers buy all our supplies, while the Canadian Corps buys all its own supplies.—Editor.

NARCOTIC AGITATION.

New York is not alone in its agitation against the narcotic drug evil. In Boston, in Philadelphia, in Chicago, in Des Moines and in half a dozen other cities, the need of a greater restriction of the sale and use of narcotic drugs is receiving much public attention. In many cases and, in fact, in most cases, pharmacists are taking an active part in the agitation. It is most unfortunate that in the agitation inaugurated in New York State by the association of justices and magistrates no effort seems to have been made to enlist the co-operation of the druggists. That the retail drug trade is anxious to prevent the illegitimate use of narcotic drugs is known to all who have kept themselves informed on the subject. The best solution of the complicated problem requires the co-operation of all good citizens, and the drug trade stands ready to give its earnest and intelligent aid in any effort to lessen this growing evil. — *Editorial, American Druggist.*

LEGISLATIVE DEPARTMENT.

ARMY DENTAL CORPS.

From Army and Navy Register.

First Lieutenant Frank P. Stone, D. S., Base Hospital, Fort Sam Houston, to Laredo District for temporary duty at the camp hospital. (July 31, S. D.)

Acting Dental Surgs. Charles C. Mann and Arthur J. Skillman, now in the Canal Zone, will proceed to Fort Sam Houston, Texas, via New Orleans, La., for examination for appointment as first lieutenants, dental surgeons, and return to proper stations. (Aug. 24, War D.)

First Lieut. George E. Stallman, D. S., upon his arrival in Honolulu on the transport Thomas about Aug. 14, 1916, to Schofield Barracks for duty. (Aug. 9. H.D.)

First Lieut. Mortimer Sanderson, D. S., Base Hospital, Fort Sam Houston, Texas, to Nogales, Ariz., for temporary duty at the camp hospital. (July 31, S. D.)

First Lieut, Cline S. Beurmann, D. S., Michigan N. G., Grayling, Mich., to El Paso, Texas, for duty with the troops of Michigan. (Aug. 15, C. D.)

Lieut. George D. Graham, D. S., Fort Sam Houston, Texas, to Deming, N. M., for temporary duty at the camp hospital, (Aug. 3, S. D.)

First Lieut. Samuel H. Leslie, D. S., Base Hospital, Fort Sam Houston, to Brownsville, Texas, for temporary duty, (Aug. 2, S. D.)

Acting Dental Surg. Terry P. Bull, Base Hospital, Fort Sam Houston, Texas, to Douglas, Ariz., for temporary duty at camp hospital. (July 31, S. D.)

First Lieut. Donald W. Forbes, D. S., Fort Sam Houston, to Laredo, Texas, for temporary duty. (Aug. 21, S. D.)

First Lieut. Lester C. Ogg, D. S., Fort Sam Houston, to Eagle Pass, Texas, for temporary duty. (Aug. 21, S. D.)

The following acting dental surgeons will proceed to Manilla and report in person Aug. 2, 1916, to Major Clement C. Whitcomb, M. C., president of the board, for examination to determine his fitness for appointment as first lieutenant dental surgeon; Samuel J. Randall, Fort Mills, Corregidor Island; Charles Taintor, Tientsin, China, (now in Manila); Don G. Moore, Camp Stotsenburg, Pampanga; Robert B. Tobias, Fort William McKinley; Harry C. Peavey, Fort William McKinley; Leigh C. Fairbanks, Fort Mills; Harry E. Kimble, Augur Barracks, Jolo (now in Manila). (July 27, P. D.)

First Lieut. Charles DeWitt Deyton, D. S., having reported at these headquarters, will proceed to Fort Apache, Ariz., for temporary duty (Aug. 26, S. D.)

First Lieut, Hugh G. Voorhies, Dental Corps, will report in person to Col. Millard F. Waltz, 19th Inf., president of an Army retiring board at Fort Sam Houston, Texas, for examination. (Sept. 20. War D.)

First Lieut. Harold O. Scott, D. S., now on temporary duty at Signal Corps Aviation School, San Diego, Cal., proceed to Palm City, Cal., temporary duty 3d Oregon Infantry. (Aug. I, Western D.)

Each of the following dental surgeons will proceed to Fort Sam Houston, Texas, for temporary duty in that department: First Lieuts. Edwin P. Tignor, Lester C. Ogg and Charles De W. Deyton. (Aug. 14, War D.)

Each of the following acting dental surgeons will proceed to Fort Sam Houston, Texas, for temporary duty in that department; Dale E. Repp, Donald W. Forbes and Samuel Kaufman. (Aug. 14, War D.)

Each of the following dental surgeons will report by telegraph to commanding general, Southern Department, for temporary duty and will join station to which he may be assigned; First Lieuts. Clarence E. Lauderdale, Harold O. Scott, Robert T. Oliver and George H. Casaday. (Aug. 14, War D.)

Acting Dental Surg. William S. Rice will report by telegraph to commanding general, Southern Department, for temporary duty and join station to which assigned. (Aug. 14, War D.)

RECOMMENDATIONS FOR PROMOTION IN ARMY DENTAL CORPS.

Recommendations were yesterday, Friday, Sept. 29, made by the acting surgeon general of the army for the promotion to the grade of captain of the Army dental corps of those first lieutenants of that branch who have qualified. The list embraces all of the rank of first lieutenant of the dental corps down to and including First Lieutenant John R. Ames.

Recommendation has also been made of sixteen acting dental surgeons who have been found qualified for promotion to the grade of first lieutenant. Three of the members of the present list, it is understood, have been found physically disqualified.

As a result of examinations which were held on July 10, appointments to the Army dental corps with the rank of first lieutenant will be made during the coming week. It remains to be deter-

mined how many of those who qualified will be appointed at once. There may not be vacancies for all of those who have qualified, but those who are not immediately commissioned will go on a waiting list and will be appointed as vacancies occur. The following named have been reported as qualified:

E. Henry Valentine, Mt. Airy, N. C.; Oscar P. Snyder, Orrville, Ohio; William Mann, Moorehead, Ky.; Joseph H. Tyler, Steubenville, Ohio; Rex McKinley McDowell, Orrville, Ohio; Charles Melville Taylor, 412½ Main street, Vancouver, Wash.; Thomas L. Smith, Red Level, Ala.; Elbert Earle Rushing, Box 1023, Atlanta, Ga.; Earl T. Dickman, route No. 3, Jackson, Mo.; Walter S. Smith, 5315 Cole street, Oakland, Cal.; Brantley I. Newsom, Salisbury, N. C.; George Ray Tressel, Ada., Ohio; Lee Benjamin Schrader, Shelbyville, Ind.; Frederick Harold Bockoven, 825 Dennison avenue, Columbus, Ohio; Aaron Fouts Eidemiller, Piqua, Ohio, and Howard I. Benedict, route No. 1, Nashville, Tenn.

WAR DEPARTMENT'S RULING IN MATTER OF MOUNTED PAY.

Some discussion has prevailed among officers of the Army dental corps as to the decision of the War Department in the matter of mounted pay. There are no present indications of this construction of the law in the case of the personnel of this corps. Going back to the ruling of the judge advocate general of the Army of September 8, 1911, it is considered by the military authorities that dental surgeons are not required to be mounted and are, therefore, not entitled to mounted pay.

PROMOTION TO RANK OF CAPTAIN.

First lieutenants of the dental corps who have had the requisite eight years' service will be promoted to the rank of captain as soon as the results of the examinations are known in the office of the surgeon general of the Army. There remain four officers to be heard from, one being in the Philippines. The promotion will probably date from June 3, the date of the act authorizing the advancement. Some experts in the War Department are inclined to take the position that the date of promotion should be July 1, but the chances are in favor of the earlier date.

RECENTLY APPOINTED OFFICERS.

Each of the following named officers, recently appointed, will proceed to the stations specified for temporary duty and instruction: 1st Lieut. George R. Tressel, Fort Terry; 1st Lieut. William Mann, Fort Thomas; 1st Lieut. Howard I. Benedict, Fort Barrancas; 1st Lieut. E. Henry Valentine, Fort Caswell, and 1st Lieut. Thomas L. Smith, Fort McPherson, W. D., Nov. 24.

Each of the following named officers, recently appointed, will proceed to the station specified for duty: 1st Lieut. Aaron F. Eidemiller, Fort Omaha, and 1st Lieut. Lee B. Schrader, Fort Benjamin Harrison. W. D. Nov. 24.

1st Lieut. Charles M. Taylor, recently appointed, will proceed to Fort Worden for duty. W. D. Nov. 24.

Each of the following named officers, recently appointed, will proceed to the station specified for temporary duty and instruction: 1st Lieut. Earp T. Dickmann, Jefferson Barracks; 1st Lieut. Walter S. Smith, Letterman General Hospital, Presidio of San Francisco, Cal.; 1st Lieut. Joseph H. Tyler, Columbus Barracks; 1st Lieut. Oscar P. Snyder, Columbus Barracks; 1st Lieut. Rex. McK. McDowell, Columbus Barracks, and 1st Lieut. Frederic H. Bockoven, Columbus Barracks. W. D. Nov. 24.

Each of the following named officers, recently appointed will proceed to Fort Sam Houston, and report to the commanding general, Southern Department for assignment to temporary duty in that department: 1st Lieut. Brantley I. Newsom and 1st Lieut. Elbert E. Rushing. W. D., Nov. 24.

1st Lieut. William A. Squires, now on temporary duty in the Southern Department, is relieved from station at Fort Leavenworth and will report for assignment to station and duty at Fort Sam Houston. W. D., Nov. 27.

ASSIGNMENT TO NEW LOCATIONS.

Each of the following named officers is relieved from temporary duty in the Southern Department and from further station at the post specified and will proceed to San Francisco, Cal., and take the transport to sail from that place about Feb. 5 for Hawaii, and at Honolulu will report to the commanding general, Hawaiian Department, for assignment to duty; 1st Lieuts. Terry P. Bull, Fort H. G. Wright, and Donald W. Forbes, Madison Barracks. W. D., Dec. 2.

Each of the following named officers is relieved from temporary duty in the Southern Department and from further station at the post specified and will proceed to San Francisco, Cal., and take the transport to sail from that place about Feb. 5 for the Philippine Islands, and at Manila will report to the commanding general, Philippine Department, for assignment to duty: 1st Lieuts. Thomas C. Daniels, Fort Myer, and Frederick R. Wunderlich, Jefferson Barracks. W. D., Dec. 2.

1st Lieut. James L. P. Irwin is relieved from temporary duty in the Southern Department and will proceed to San Francisco, Cal., and take the transport to sail from that place about Feb. 5 for the Philippine Islands, and at Manilla will report to the commanding general, Philippine Department, for assignment to duty. W. D., Dec. 2.

1st Lieut. Richard B. Clark is relieved from duty in the Western Department and from station at Fort Winfield Scott and will proceed to San Francisco, Cal., and take the transport to sail from that place about Feb. 5 for Hawaii, and at Honolulu will report to the commanding general, Hawaiian Department, for assignment to duty. W. D., Dec. 2.

Each of the following named officers now on temporary duty at the recruit depot specified will accompany any recruits that may be sent from the depot to the border, and upon arrival in the Southern Department will report by telegraph to the commanding general, Southern Department, for assignment to temporary duty in that department: 1st Lieuts. Earp T. Dickmann, Jefferson Barracks; Joseph H. Tyler, Columbus Barracks; Oscar P. Snyder, Columbus Barracks; Rex McK. McDowell, Columbus Barracks, and Frederic H. Bockoven, Columbus Barracks. W. D., Dec. 2.

1st Lieut. Walter S. Smith is relieved from temporary duty at the Letterman General Hospital, the Presidio of San Francisco, Cal., and will report by telegraph to the commanding general, Southern Department, for assignment to temporary duty and station in that department and will join the station to which he may be assigned. W. D., Dec. 2.

MILITIA DENTAL SURGEONS.

List subject to revision. Appointed under the Defense Act June 3rd, 1916.

Ohio.

Address Headquarters Ohio Troops, El Paso, Texas, or care of Adjutant General, Columbus, O.

Dr. Lester F. Kishler, 304 West Tiffin St., Fostoria, Ohio.

Dr. Paul J. Aufderheide, 4255 E. 96th St., Cleveland, Ohio.

Dr. Earl J. Swan, P. O. Box 486, Lima, Ohio.

Dr. John A. Sites, 626 Washington Ave., Defiance, O.

Dr. Ralph R. Parker, L. B. 84, Burton, O.

Dr. Carl E. Bobo, 941 Hunter St., Columbus, O.

Pennsylvania.

Address, care of Adjutant General Penn, Militia, Harrisburg, Pa.

Lt. Walter W. Hinchman, McKeesport, Pa.

Lt. Edwin St. C. Wren, Reading, Pa.

Lt. Byron S. Behney, Harrisburg, Pa.

Lt. Langhorne W. Fink, Reading, Pa.

Lt. Harry McC. Carter, Montgomery, Pa.

Lt. John A. Reilly, Wilkes-Barre, Pa.

Lt. Robert D. Miller, Norristown, Pa.

Lt. Stanley G. Shannon, 2nd and Taber St., Philadelphia, Pa.

Lt. Chauncey Ely Dresser, 213 E. Goepp St., Bethlehem, Pa.

Indiana.

Care of Adjutant General, Indianapolis, Ind., or 1st Indiana Brigade, Llano Grande, Texas.

Lt. John E. Shill, Winnemac, Ind.

Lt. R. F. Ross, Bloomington, Ind.

Lt. John W. Puffer, Indianapolis, Ind.

District of Columbia.

Lt. Douglas A. White, Camp Wilson, Fort Sam Houston, Texas. 3rd Inf., N. G. D. C.

New Jersey.

Address care of Adjutant General, N. J. Militia, Trenton, N. J.

Lt. Leroy T. Asche, Newark, N. J.

Lt. Albert M. Applegate, West End, N. J.

Lt. Frederick H. Huff, no address given except as above.

Tennessee.

Lt. John D. Weldon, 1st Tenn. Inf., Eagle Pass, Tex.

Lt. Robt. I. Morris, 2nd Tenn. Inf., Pharr, Tex.

Arkansas.

Lt. Alexis Francis Searle, Arkansas N. G., Deming, New Mexico.

Kansas.

Lt. Waller W. Harrell, Osawatomie, Kan.

Lt. Walter W. Hunt, Oskaloosa, Kan.

Wisconsin.

Lt. Willis W. Barney, 3rd Brigade, 12th Div., San Antonio, Texas.

Georgia.

Lt. Julius Seamans; Lt. Wm. L. Bethea; Lt. Trueman J. Slade.

With Georgia troops at El Paso, Texas.

Connecticut.

Lt. Maurice W. Haag; Lt. Abraham B. Rosoff. No address given, except with Connecticut troops on the border, El Paso, Texas.

Virginia.

Lt. John Mortimer Hughes, 1st Virginia Inf.

Lt. Ewart G. Gates, 2nd Virginia Infantry, on border.

Maine.

1st Lt. Milbourn M. Fowler, Skowhegan, Maine.

Louisiana.

Lt. Walter C. Hava, Brownsville, Texas.

Michigan.

Lt. Robert E. Motley, El Paso, Texas.

Lt. Cline S. Beurmann, El Paso, Texas.

New York.

Lt. Austin C. Bamford, 69th Inf., N. Y. N. G., Mission, Texas.

Lt. Chas. R. Dayton, 1st Cav., N. Y. N. G., McAllen, Texas.

Lt. Lambert Robert Ocder, 2nd F. A. N. Y. N. G., McAllen, Texas.

Lt. Henry Jacob Stehl, 71st Inf., N. Y. N. G., 105 East 33rd St., New York City.

Lt. David B. Warren, N. Y. Inf., Brigade, McAllen, Texas.

Iowa.

Lt. Townsend A. Pearson, Glenwood, Iowa. At Brownsville, Texas, 3rd Iowa, Inf.

Lt. Fred F. Ballard, Davenport, Iowa. At Brownsville, Texas, 2nd Iowa, Inf.

Lt. Glenn H. McCreight, Creston, Iowa. At Brownsville, Texas, 1st Iowa Inf.

Nebraska.

Lt. F. C. Maloney, 5th Nebraska Inf., Llano Grande, Texas. (More to be appointed).

West Virginia.

Lt. Thomas E. Wright, 2nd W. Va. Inf., Fort Sam Houston, Texas.

Massachusetts.

Lt. Myron E. Bryant, 62 Summit Road, Medford, Mass.

Lt. Clifford W. Renth, 48 Graves Ave., Northampton, Mass.

Lt. Arthur G. Buehler, 640 Huntington Ave., Boston, Mass.

Lt. Dwight R. Clement, 333 Main St., Stoneham, Mass.

Lt. Walter G. Doherty, 49 Farragut Rd., South Boston, Mass.

Lt. Bernard B. Burston, 652 Tremont St., Boston, Mass.

Lt. Ralph E. Cunningham, 6 Miller St., Gloucester, Mass.

Lt. Harold H. Buehler, 640 Huntington Ave., Boston, Mass.

North Carolina.

Lt. Burwell F. Hall, Asheville, N. C. At Camp Stewart, El Paso, Texas.

Lt. Ben J. Durham, Asheville, N. C. At Camp Stewart, El Paso, Texas.

Lt. Adolphus E. Worsham, Spencer, N. C. At Camp Stewart, El Paso, Texas.

Maryland.

Lt. Henry E. Lupus, Field Hospital, No. 1, Camp Shafter, Eagle Pass, Texas.

Lt. Lewis B. Gatch, Field Hospital, No. 1, Camp Shafter, Eagle Pass, Texas.

Alabama.

Lt. Lawrence M. Barnett, Bessemer, Ala. At Mobilization Camp, Montgomery, Ala.

Lt. James M. Miller, Florala, Ala., or care of Adjutant General.

Lt. Malcolm G. Dabney, Birmingham, Ala., Alabama Militia, Montgomery, Ala.

Oregon.

Lt. Richmond Wells, 3rd Oregon Inf., care Adjutant General Oregon Militia, Salem, Oregon.

Texas.

Lt. James Browder Seay, Falfurrias, Texas.

Lt. John Edwin Hymes, Fort Worth, Texas.

Illinois.

Lt. Martin L. Johnson, 3rd Illinois Inf., Fort Sam Houston, Texas. (More to be appointed).

Kentucky.

Lt. Ura M. Bryant, Island, Ky. Present address: Fort Bliss, Texas.

Lt. Omar S. Meredith, Leitchfield, Ky.

Lt. Hubert E. Royalty, Hardinsburg, Ky.

Minnesota.

Lt. Jerome L. Fritsche, 1st Minn. Inf. Address, care of Adjutant General.

Lt. Elmer J. Sundby, 2nd Minn. Inf., Minnesota Militia, St. Paul, Minn.

Lt. George W. Krough, 3rd Minn. Inf.

Mississippi.

Lt. Peter Bliss Green, 1st Miss. Inf., Fort Sam Houston, Texas.

California.

Lt. R. P. Wilcox, Los Angeles, Cal., Mobilization Camp, or care Adjutant General Cal. Militia, Sacramento, Cal. (More to be appointed).

Oklahoma.

Lt. William E. Busby, McAlester, Oklahoma.

The following states have not appointed dental surgeons in their Militia, Arizona, Florida, Montana, Nevada, South Carolina, Delaware, Idaho, New Hampshire, New Mexico, North Dakota, Rhode Island, South Dakota, Utah, Vermont, Wyoming.

The following states have not been stated whether dental surgeons have been appointed or not: Colorado and Missouri.

THE JOURNAL of the NATIONAL DENTAL ASSOCIATION

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VOL. 4 JANUARY, 1917 NO. 1

EDITORIAL DEPARTMENT.

To Our Readers: A Happy and Prosperous New Year.

DENTAL CARIES.

The report of the further studies of dental caries, as made by Bunting and Wixon under the auspices of the Research Commission appear in this issue of The Journal. They have reviewed the work of Dr. William Marshall, of California, who reported that certain factors to be obtained by titration of the saliva were an indication of the susceptibility of the individual to dental caries. They report that their observations

of a large number of cases do not support the assertions made by Marshall.

Bunting and Wixon further checked the statements of Gies, Pickerill and others, that acid foods and mouth washes induce an increase of alkalis and an acid decrease in the saliva. They found that the reactions of the saliva to both acids and alkali alike produced a slight decrease of acids and increase of the alkalis which were but temporary in their character; that the chewing of paraffins and gums would produce as marked reaction in the saliva as would lemon and oranges. They conclude that mastication has larger influence upon the character of the saliva than the nature of the food ingested, another good reason for Fletcherism.

The data concerning the amounts of calcium in the saliva in respect to the condition of the teeth, which has been reported in earlier papers, was further checked, and the authors state that of all salivary constituents, this one bears the closest relation to the condition of the teeth of any which have been studied.

They then present cuts of teeth which have been polished by various methods and show that no methods of polishing will render the surface of a tooth dense or impervious to fluids. But they state that they believe that such teeth become dense after exposure to the action of the saliva, which belief is founded upon ex-perimental evidence and clinical observations.

The report is but a statement of studies which the authors have pursued in their efforts to clear up some of the unknown factors in the great problem of dental caries.

KNOWLEDGE OF NORMAL TISSUE NECESSARY FOR RECOGNITION OF PATHOLOGICAL CHANGES.

The colored illustrated article by Gillette Hayden, in this issue of The Journal, attempts to call attention to the appearance of the visible investing tissues of the teeth in their normal condition, and to show by means of the specimen the form and coloring of average normal gums and gingivae and the relative positions of the teeth and their investing tissues. The peridental membrane is, of course, not visibly represented.

It is essential to have a definite picture of the normal mouth in mind if the variations from the normal are to be noted. No recognition of pathological change is possible without a knowledge of the average normal state of the tissues.

The author has tried to show the gradual and progressive changes

which occur in the investing tissues of the teeth as a result of the collection of foreign substances on the tooth surfaces.

The idea seems to prevail that some sudden, unrecognizable, mysterious and ungovernable condition is responsible for **all** these degenerative changes in the investing tissues. Many times effort has been made to disabuse our minds of this general belief and this is but another attempt to demonstrate that the changes from the normal are gradual and are accompanied by fairly definite signs and signals, even the first of which the profession in general should be able to read and act upon.

This article makes no attempt to discuss any but those changes brought about by the presence on the tooth surfaces of debris,—foreign substances,—filth,—whatever one may choose to call that collection of irritating tissue destroying matter which has no legitimate place in any mouth under dental observation.

In presenting these composite pictures of the progressive changes which take place in the mouths of patients under dental care, a few may be led to observe more closely the causes of slight inflammations of the gingivae and to interpret more readily the meaning of the first signs of distress in the investing tissues of the teeth.

THE SALE OF CHRISTMAS SEALS.

Thousands of dollars have been received thru the General Secretary's office for the Christmas seals, mailed to our membership by the Relief Fund Committee. To those who purchased seals our Committee extends its profound thanks.

For some inexplainable reason a very few have returned their stamps. It would seem that these few members of our profession have failed to realize that they have a debt of responsibility and obligation to the unfortunate members of our profession. It may take a San Francisco earthquake, a Galveston flood, possibly something like a Chicago or Baltimore fire, to wake up such members to their individual responsibility, especially if such a catastrophe should come near their door. As members of a great profession, "Are we our brother's keeper?"

There are still a very few others who, thru indifference, negligence, or possibly thru carelessness, have failed to respond to this appeal from our Relief Committee, and now have in their possession the Christmas stamps. The Committee hopes that these delinquent members will send in their checks immediately and thus save the expense of writing them a personal letter. "So by staying indoors we can avoid the risk of catching cold; but we will also miss the glory of the sunrise, the swing of the

cloud in the midsummer sky, the subtile witchery of the twilight—in a word, life."

The Relief Fund will reach a total of $25,000 from the sale of Christmas seals this year, if every dentist will help carry his share of this obligation.

A small financial sacrifice, cheerfully given in a spirit of sympathetic helpfulness, will some day return to the donor and to the dental profession in a harvest of rich blessings. "Those that love their owne chimney corner and dare not fare beyond their owne towne's end, shall never have the honor to see that wonderful workes of God."

THE BLACK MEMORIAL.

The initial activity of the Black Memorial Committee, of which Dr. Wm. H. G. Logan, Chicago, is chairman, was brought to our consideration by a letter which reached the membership November 10, 1916, and from which we quote the following:

> "At the 1916 meeting of the National Dental Association a Committee was appointed to arrange for a suitable Memorial to be erected to Dr. G. V. Black in commemoration of his signal service to the profession and to humanity.
>
> The name of G. V. Black must ever remain synonymous with all that is scientific and progressive in dentistry and his profession will do itself honor in honoring his memory. Believing every dentist will feel it a personal privilege to assist in the movement, this appeal for a contribution of either two or three dollars is made to every member of the National Dental Association. The amount requested is made small purposely so that every dentist may be represented by a small sum rather than a few with large sums. Of course, those who were great admirers or personal friends of Dr. Black will want to contribute more, and for this the Committee will be grateful.
>
> A list of donors will be printed in The Journal of the National Dental Association, placed in the library of the Northwestern University Dental School and enclosed within the cornerstone of the Memorial."

Every member will welcome the rare privilege of contributing one of a vast number of leaflets which are to be wrought into a mighty laurel that the Dental World will lovingly place on the brow of Greene Vardiman Black.

In 1857 Dr. Black established his first dental office and he noted at once the pitiable paucity of every form of equipment with which his profession should be endowed.

Original, resourceful and aggressive, he began the task of gathering the loose ends of dentistry's heritage. These he separated, arranged and classified with an instinct that was true. This was soon accomplish-

ed. With heroic courage, largeness of faith and masterful will he then began the real work of his career. With marvelous foresight and insight as to dentistry's needs he set himself to the task of placing it upon a firm scientific foundation. He solved its most profound scientific problems with the same facility that he invented and developed its mechanical appliances. As a writer and teacher he moulded the thought and directed the activities of his calling with an inspiration born of genius. The history of dentistry during the past fifty years is largely the record of his accomplishments.

There is nothing uncertain or problematical about the results of his many and varied endeavors. And while it is not possible in any terms we may employ to give a comprehensive grasp of the large practical benefits the profession and mankind generally have derived from his wonderfully competent life, yet even the least informed among us know that Dr. Black is dentistry's greatest benefactor; that he smoothed the path of our professional lives; that in simplifying the old methods and developing the new he enabled us to practice with ease and efficiency unheard of before.

He has set us standards for governing the conduct of every phase of our vocational lives and labored not for himself, but unselfishly for others. His influence is vital and will endure even tho he has sought repose in sleep eternal.

As Dr. Black was the most widely honored man of his profession it is pleasing to contemplate that as master minds have ever come forward to successfully cope with epochal crises in the history of nations, so from among our own number arose an intellectual giant to mould and guide the profession of Dentistry in the greatest epoch of its history. This, too, in light of the fact that reckoned by our present standards his educational advantages were meagre, yet by the sheer force of his tireless energies of brain and will he developed a trained intelligence that made him one of the profoundest scientific men of his time. The mind gropes vainly thru the ages of the past for another of his genius.

And he was one of us! Thrice welcome is the opportunity placed in our hands by the committee to humbly proclaim our indebtedness, the Profession's indebtedness, the World's indebtedness to Greene Vardiman Black.

LAFAYETTE LAYMAN BARBER, D. D. S.

President of the National Dental Association.

By Dr. J. R. Callahan, Cincinnati, Ohio.

(See Frontisplece.)

LAFAYETTE LAYMAN BARBER, the third son of Robert and Emeline Barber, was born in Wood County, Ohio, August 5th, 1860. He started his education in the public schools of Perrysburg, to which place his family moved when he was five years old. In his early school days he worked during the summer months and attended school in the winter time.

LaFayette Barber entered the Ann Arbor Dental School in 1882, graduating in March, 1885, despite the fact that an attack of typhoid fever kept him from his college work for five months, from August, 1883, to January, 1884. After graduation he went directly to the city of Toledo, where he began the practice of Dentistry and has since been located. He married Miss Sarah E. Mayley, of Cleveland, Ohio, on April 23rd, 1890.

Dr. Barber has been president of the Toledo Dental Society, the Northern Ohio Dental Society and the Ohio State Dental Society. He has served as a member of the Ohio State Board of Dental Examiners for four years and was on the reorganization committee of the Ohio State Dental Society. He has been a delegate to the Dental Congresses held in Paris and London, and attended the one held in Berlin, giving clinics at some of these congresses.

Dr. Barber has been a valuable man to the Ohio State Dental Society, not having missed a meeting in twenty-five years. He is a man ever ready and willing to respond to any need of the society; his ability for official duties, committee work, papers, and discussions, and his purse are always open for the good of the Cause. He is always prompt and efficient.

"Knowing the past history enables one to judge of the future." "Knowing" Dr. Barber as we do, enables us to predict with confidence that the members of the National Dental Association will feel well satisfied with his administration.

IMPORTANT INFORMATION REGARDING THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

THE Annual Meeting of the Dental Protective Association of the United States, was held at the Palmer House, Chicago, Illinois, on December 18, 1916, at 4 P. M. A brief synopsis of the meeting is here given for the benefit of the members who were unable to attend in person.

The Treasurer, Dr. D. M. Gallie, reported that the total assets of the Association were $35,617.04. Of this amount, $26,000 is in approved municipal bonds, 4,000 in Harbough notes, secured by collateral notes, as reported at our last annual meeting, and the balance in cash in a savings and checking account.

It was reported last year that Dr. A. F. James, of Chicago, a member of the Association in good standing, had been sued by Cassius M. Carr for an alleged infringement of a patent. Since this time Dr. Thomas B. Hartzell, of Minneapolis, also a member of the Association in good standing, has been sued by the same party, and on practically the same grounds. We quote from the report of the attorney for the Association, Mr. P. B. Eckhart, of the law firm of West and Eckhart, regarding these suits, both of which are being defended by the Association: "During the past year your attorney's activities for the Association have been for the most part, directed toward the preparation for trial of the two patent suits brought against members of the association. These cases are now ready for trial. One of them will likely be disposed of without trial so far as the association's interest in it is concerned. On Tuesday, December 12th, the United States Court sustained our motion to dismiss the bill for lack of jurisdiction. Upon the merits of the case we expect to be able to defeat the claim of the patentee. It is interesting to note that a decree by default against an eastern dentist who had neglected to procure an attorney or pay any attention to the suit, was entered in a patent suit brought in Chicago by the same claimant. This decree cannot be used as a precedent against us, however, and it is doubtful whether it has any validity by reason of certain defects in procedure."

A matter of importance to the members is an intended change to be made in the By-Laws of the Association by the Board of Directors. According to the By-Laws it has been necessary to mail a notice of the annual meeting to each individual member. Inasmuch as there are no annual dues to be collected, and inasmuch also as only a few members attend the annual meeting in person, it seems to be a needless expense and entails unnecessary labor on the part of the officers, who are not compensated for their services, to send this individual notice. This matter was discussed and it was agreed by all present that a notice in The Journal of the National Dental Association, and all other important journals, should be sufficient; that it was generally understood that the annual meeting of the association is always held on the third Monday in December, at 4 P. M., in Chicago. The Board of Directors, accordingly, will make this change in the By-Laws, and all members should take notice and govern themselves accordingly.

The work of the Board of Directors for the past year was ratified by the association by a unanimous vote; and the present Board was re-elected for the ensuing year.

By order of the Board of Directors:

J. G. REID, President,

J. P. BUCKLEY,

Vice Pres. and Secretary,

D. M. GALLIE, Treasurer.

Chicago, Ill., December 22, 1916.

ANNOUNCEMENTS.

NATIONAL SOCIETIES.

National Dental Association, New York City, October 22-26.

American Institute of Dental Teachers, Philadelphia, Pa., January 23-24, 25.

STATE SOCIETIES.

February.

Minnesota, Minneapolis, February 23 and 24.

April.

Alabama—Birmingham, April 10.

Michigan—Detroit, April 12, 13 and 14.

Oklahoma—Oklahoma City, April.

South Dakota.

Virginia—Norfolk, April 17, 18 and 19.

West Virginia—Fairmount, April 11, 12, and 13.

May.

Illinois—Quincy, May 8, 9, 10 and 11.

Indiana—Indianapolis, May 15, 16 and 17.

Iowa—Des Moines, May 1.

Kentucky—Louisville, May 9, 10 and 11.

Massachusetts—Boston, May.

Nebraska—Omaha, May 14, 15, 16 and 17.

New York—Rochester, May 10, 11 and 12.

South Carolina—Columbia, May 8.

Southern California — Los Angeles, May.

Vermont—May 16, 17 and 18.

June.

Colorado—Glenwood Springs, June.

Florida—Atlantic Beach, June 20, 21 and 22.

Georgia—Brunswick, June.

New Hampshire—Soo-Nipi, June 20, 21 and 22.

North Carolina—Durham, June 27, 28 and 29.

Pennsylvania—Philadelphia, June.

Tennessee—Memphis, June.

Utah—Salt Lake City, June.

Wyoming—Cheyenne, June 12.

July.

New Jersey—Asbury, July.

Wisconsin—July 10.

October.

National Capital—Chamber of Commerce, October 2.

Rhode Island—Providence, October.

November.

Arizona—Phoenix, November.

ANNUAL CLINIC OF THE CHICAGO DENTAL SOCIETY.

The annual clinic of the Chicago Dental Society will be held at the Hotel La-Salle, January 26-27, 1917.

Extensive preparations are being made to make this one of the best clinics ever held by the society.

Papers of the highest type, clinics demonstrating the very latest and best in modern dentistry, exhibits of the newest appliances by firms from all over the United States, and a banquet that will be a pleasure long to be remembered are but a part of the features of this great meeting.

Dr. Joseph Bloodgood, of Baltimore, will present the paper at the meeting on Friday evening and at the banquet on Saturday evening. Dr. Vincent of Minneapolis will be the first speaker, after which the meeting will take the form of a testimonial for Dr. Edmund Noyes.

Headquarters, Hotel La Salle.

GEORGE C. POUNDSTONE,
President.

Percy B. D. Idler, Secy.,
30 N. Michigan Ave., Chicago.

VIRGINIA STATE DENTAL ASSOCIATION.

Virginia State Dental Association will meet in Norfolk, April 17th, 18th and 19th, 1917. All members of the National Dental Association, or any State Society, are cordially invited to attend.

C. B. GIFFORD, Norfolk, Va.,
Corresponding Secretary.

KENTUCKY STATE DENTAL SOCIETY.

The next annual meeting of the Kentucky State Dental Association will be held at Louisville the three days previous to the Kentucky Derby—May 9, 10, 11, 1917. Address all correspondence to the Secretary.

W. M. RANDALL, Secretary,
1035 Second Street,
Louisville, Kentucky.

NORTH CAROLINA DENTAL SOCIETY

The North Carolina Dental Society will hold its forty-third annual meeting at Durham, N. C., June 27, 28 and 29, 1917.

R. M. SQUIRES, Sec'y.,
Wake Forest, N. C.

CHICAGO DENTAL SOCIETY MEETING.

We wish to announce that on Friday and Saturday, January 26th and 27th, 1917, the Chicago Dental Society will hold its 53rd Annual Meeting and Clinic at the Hotel LaSalle, Chicago. Every effort is being made to have this a successful and beneficial meeting. With this end in view, the services of notable essayists will be obtained to read papers on subjects of the day and of vital importance to the dental profession.

As is customary, a banquet will be given. It has been decided this year that in recognition of valuable services rendered to the profession, the banquet be made a testimonial in character, and dedicated to Dr. Edmund Noyes. Dr. Noyes is the oldest member of the Chicago Dental Society and his services to the profession have been commensurate with this formal recognition.

Fraternally yours,
J. E. SCHAEFER,
L. E. JELINEK,
W. G. CLARK.

MID-WEST DENTAL CONVENTION AND EXHIBITION.

The Mid-West Dental Convention and Exhibition will be held at Des Moines, Iowa, May 1, 2, 3 and 4, 1917. This is to be a meeting of the Iowa State Dental Society in conjunction with the Dental Manufacturers' Club. The program will be so arranged as to include Clinics and Lectures. A part of the program will be open to the general public. Plans are being perfected to secure the best lectures and clinicians in the United States.

A more specific announcement will appear in a later issue of The Journal of the National Dental Association.

C. M. KENNEDY, Secretary,
605 C. N. B. Bldg.,
Des Moines, Iowa.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS.

The Preparedness League of American Dentists is meeting with great success. Study units, in conformity with Army requirements, are being established in principal cities. Its purpose is to prepare Dental Surgeons for Army service in time of need. This organization has the hearty support of the Government and much beneficial legislation governing the Army Dentist is sure to result.

This organization policy appeals to all patriotic dentists and at the present time, in case of war, we could place at the disposal of the Government the best men in the profession. If you have not

joined, do so at once, for you cannot afford to be quiet on this subject.

The private is called to a life of great sacrifice in time of war and the Army Dental Surgeon is needed to help keep these men in shape and to look after them when wounded. Our place is to be ready when our Country calls, whether in times of peace or war.

J. W. BEACH, Chairman.

PRESENTATION OF THE LOVING CUP TO THOMAS ALEXANDER FORSYTH.

SPECIAL INVITATION.

Gentlemen of the Dental Profession:

You are cordially invited to participate in the presentation by the dental profession of a loving cup to Mr. Thomas Alexander Forsyth at a banquet on Saturday, January 20, 1917, at half after six o'clock at the Hotel Somerset, Boston.

Tickets for this banquet (subscription $5.00) can be obtained from any member of the committee. Checks should be made payable to Dr. Charles J. Smith, 35 Butler Exchange, Providence, R. I.

BANQUET COMMITTEE ON PUBLICITY.

Frederick A. Keyes, D. M. D., Chairman.

Percy R. Howe, D. M. D.

F. S. Belyea, D. M. D.

CITY PRACTICE FOR DENTIST—Really selling for 50 cents on dollar. Equipment, furniture, etc.; cost about $2,000. Price $1000. Practice $7,000 year. Established twelve years. Modern equipment, etc. Going to teach and specialize—therefore bargain offered. Don't delay. Address, Dr. J. A. Zabrochi, Logan Bldg., St. Joseph, Mo.

DENTAL LOCATION—Large territory—100 miles. Easily do $400 to $500 month. Offer a fine deal in residence, land, etc., to a Dentist who can pay some down. Fine climate and health resort district. People want Dentist. $2500 swings deal. Am government physician here—have been for 20 years. Address, E. S. Goodhue, M. D., Holualoa, Hawaii.

HOLLAND DENTISTS ESTABLISH AN OFFICIAL PAPER.

Amsterdam, October 21, 1916.

To the Honorable Secretary of the National Dental Association of the U. S. A.

Dr. Otto U. King, Huntington, Ind.

Dear Colleague:—We herewith beg to inform you that the Nederlandsche Maatschappij Tot Bevordering Der Tandheelkunst" (National Dental Association of Holland) was founded on the fourteenth of August, 1914.

Circumstances over which we had no control prevented us from informing you earlier.

Yours faithfully,

W. C. KOEDWEJA,

Honorable Secretary of the Nederlandsche Maatschappij Tot Bevordering Der Tandheelkunst.

A. A. W. UAMER, President.

CONTRIBUTIONS.

CONTRIBUTIONS TYPEWRITTEN.

Contributions should be typewritten—**double-spaced and with ample margins.** The expense is small to the author—the satisfaction is great to the editor and printer. We cannot promise to return unused manuscript, but try to do so in every instance. **Used manuscript is not returned.** Manuscripts should not be rolled.

ILLUSTRATIONS.

Half-tones and zinc etchings will be furnished by The Journal when satisfactory photographs or drawings are supplied by the author. Negatives are not acceptable. Each illustration, table, etc., should bear the author's name on the back. Photographs should be clear and distinct; drawings should be made in black ink on white paper. While we cannot guarantee to return used photographs and drawings, we use our best endeavors to do so after the article is published.

ANONYMOUS CONTRIBUTIONS,

Whether for publication, for information, or in the way of criticism, are consigned to the waste-basket.

NEWS.

Our readers are requested to send in items of news, also **marked** copies of newspapers containing matters of interest to dentists. We shall be glad to know the name of the sender in every instance.

IN 1917 THE JOURNAL OF THE NATIONAL DENTAL ASSOCIATION WILL PRESENT SOME NOTABLE CONTRIBUTIONS.

SOME OF THE ESSAYS AND PAPERS.

Indications and Contra-Indications for Treating Teeth involved with pyorrhea Alveolaris.
By J. D. Patterson, D. D. S., Kansas City, Mo.

The Surgical Treatment of Pyorrhea Alveolaris.
By Carl D. Lucas, D. D. S., Indianapolis, Ind.

Prophylaxis for Pyorrhea.
By Paul R. Stillman, D. D. S., New York City.

Oral Prophylaxis for Children.
By Gillette Hayden, D. D. S., Columbus, O.

The Present Status of Porcelain in Dentistry.
By Hugh Avary, D. D. S., San Francisco, Cal.

Cavity Preparation for Gold Foil, Gold Inlay and Amalgam Operations.
By Walden L. Ferrier, Burlington, Wash.

The Predicament of Crown and Bridgework.
By Forrest H. Orton, St. Paul, Minn.

The Chemistry and Pharmacology of the Treatment of Pulpless Teeth and Their Sequellas; including the Preparation of the Canals for filling.
By J. P. Buckley, Ph. G., D. D. S., Chicago, Ill.

Oral and Sinus Surgery under Nitrous Oxid- Oxygen Anesthesia in the Forward inclined, Sitting Posture.
By Ira O. Denman, Toledo, Ohio.

The Aseptic Transalveolar Root Resection Operation.
By Robert H. Ivy, M. D., D. D. S., Milwaukee, Wis.

Indications for the Removal of Teeth in Cases of Focal Infection.
By Virgil Loeb, A. B., M. D.. D. D. S., St. Louis, Mo.

Dental Education, Past, Present and Future.
By H. M. Semans, M. A., D. D. S., Columbus, Ohio.

The State Dental Society as an Important Legislative Factor.
By Homer C. Brown, D. D. S., Columbus, Ohio.

A Comparison of the Advantages Obtained by the National Dental Association Thru Its Legislative Committee for our Representatives in the United States Army and State Militia.

Oral Hygiene: Its Relation to Anesthesia, Analgesia and the Anesthetist.
By Bion R. East, D. D. S., Detroit, Mich.

Some Theoretical Considerations Concerning Chloroform.
By Evarts A. Graham, M. D., Mason City, Ia.

A Study of the Disputed Points in Local Anesthesia.
By S. L. Silverman, D. D. S., Atlanta, Ga.

A Study of the Efficiency of Disinfectants and of Ionization in Root Canals of Infected Teeth.
By B. E. Dahlgren, D. M. D., Minneapolis, Minn.

Manipulation of Silicate in the Making of a Filling.
By W. Clyde Davis, M. D., D. D. S., Lincoln, Neb.

Modern Amalgam Restorations.
By J. V. Conzett, Dubuque, Iowa.

Taking Impressions in Modeling Compound and Anatomical Setting Up of Teeth.
By James P. Ruyl, D. D. S., New York City.

The Prevention of Malocclusion.
By Dr. J. Lowe Young, New York City.

The Post-Graduate Dental Meeting.
By C. R. Lawrence, D. D. S., Enid Okla.

Essentials for the Success of the Progressive Clinic Plan.
By Weston A. Price, M. S., D. D. S., Cleveland, O.

Oral Hygiene and Its Relation to Public and Individual Health.
By Otto U. King, D. D. S., Huntington, Indiana.

Preparedness in Oral Hygiene.
By L. G. Mitchell, Oklahoma City, Okla.

Oral Hygiene in the Army.
By J. R. Bernheim, D. D. S., Fort Logan, Colorado.

The General Plan of the Proposed Work at the Eastman Dispensary.
By Harvey J. Burkhart, D. D. S., Rochester, N. Y.

The Relation of Mouth Infections to Systemic Infections.
By Thomas B. Hartzell, Minneapolis, Minn.

Root Canal Filling.
By John R. Callahan, Cincinnati, O.

Studies for the Indentification and Differentiation of Pathogenic Organisms of Mouth Infections.
By Weston A. Price, LeRue P. Bensing, Cleveland, O.

Galvanic Medication Studies, Including Electric Ionization.
By Weston A. Price, Cleveland, Ohio.

Peridental Membrane.
By Frederick B. Noyes, Chicago, Ill.

The Relation of the Glands of Internal Secretion to Dental Problems.
By William J. Gies, New York City.

Salivary Deposits.
By Percy R. Howe, Boston, Mass.

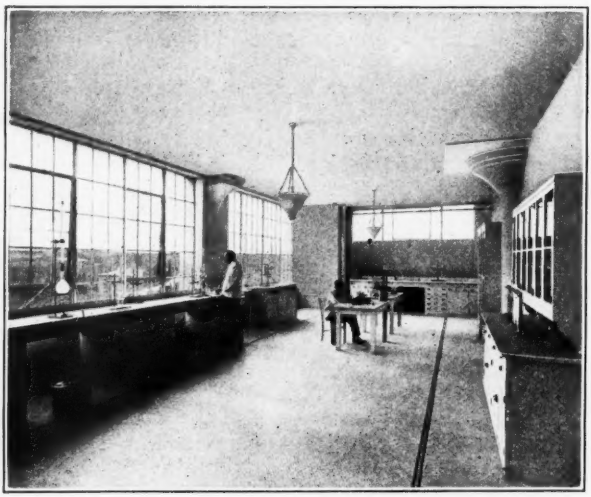
Dental Cements.
By Marcus L. Ward, Ann Arbor, Mich.

Brown Stain Problems.
Frederick S. McKay, Colorado Springs, Col.

Metallurgical Researches.
Frank A. Fahrenwald, E. M., M. S., Ph. D., Cleveland, O.

TAKE NO CHANCES.—Pay your 1917 dues early this month, so that your State Society officers will have plenty of time to forward that part which constitutes National Association Dues ($2.00) to the National Secretary.

Otherwise your Journal subscription may lapse and it may be impossible to furnish you with back numbers.



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